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REACTIONS FROM THE TRANSFUSION OF PRESERVED BLOOD

EXPERIENCE WITH 1,600 TRANSFUSIONS

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The convenience of using preserved blood for transfusions was first demonstrated by Robertson (1918), working at the casualty clearing stations of the Third Army, B.E.F., in 1917–18. He collected and stored blood during periods of inaction at the front and administered it during rush times, utilizing the blood–dextrose–citrate mixture which had been devised by Rous and Turner (1916) of the Rockefeller Institute. Subsequent experience in the practice of civil medicine in Russia, France, Great Britain, and the United States of America, and in the treatment of the wounded in the recent war in Spain, has confirmed and amplified Robertson's original observations as to the expediency of this procedure.

There remain, however, two basic questions regarding the use of preserved blood: first, Is transfusion of such blood more dangerous than the use of fresh blood?; secondly, Is stored blood therapeutically as efficacious as fresh blood? In this report an attempt is made to answer the first question by a study of the types and incidence of reactions occurring in a series of approximately 1,600 blood transfusions.

Organization of "Blood Bank"

The Blood Transfusion Laboratory of the University Hospitals was organized in September, 1938, after preliminary studies in the laboratory with various methods of blood preservation. The principle of the "blood bank" evolved at Cook County Hospital in Chicago (Fantus, 1937; Fantus and Schirmer, 1938) was adapted to local conditions. The relatives and friends of patients who volunteered as donors were taken to a specially equipped room, where the blood was collected by members of the laboratory staff. The blood was typed by technicians, and specimens were subjected to the Wassermann and Kahn tests. The blood mixtures were stored in a refrigerator at 3° to 5° C. When a patient required a transfusion his blood group was determined and both plasma and cells of the prospective recipient were cross-matched with those of a blood mixture in storage. If the bloods were compatible the proper flask was delivered to the intern in charge of the patient and he administered the blood mixture intravenously. The urine of the recipient was tested before transfusion and, if found to be acid, sodium bicarbonate was administered orally until the urine was alkaline before the transfusion was performed. However, this procedure was not practicable in emergencies. Within twenty-four hours after transfusion a member of the laboratory staff visited the patient to determine whether a transfusion reaction had occurred, and performed chemical tests for haemoglobin on the twenty-four-hour urine specimen passed after transfusion. If there had been a severe reaction of any type, tests for groups and cross-matching were repeated.

Collection of Blood

The donors who were accepted were healthy adults of either sex between the ages of 16 and 60. They were questioned specifically for a history of venereal disease, malaria, and allergic manifestations. They were not allowed to give blood if suffering from the slightest upper respiratory infection. This precaution was employed so that the subsequent course of such a disease could not be ascribed to loss of blood. No donor was accepted who was suffering from active manifestations of allergy, although the blood of persons having hay-fever was used when drawn during the months when they were free from symptoms. At least three hours must have elapsed since the donor had eaten before the blood was drawn. No donor was allowed to give more than 500 c.cm. of blood in two months.

The collecting apparatus consisted of an Erlenmeyer flask of 1,500 c.cm. capacity in the mouth of which was a two-holed rubber stopper. Short glass tubes were fitted into the holes of the stopper. The outer end of one glass tube was attached to a length of rubber tubing connected to a rubber suction-bulb containing a valve. The other glass tube was connected by means of a short gum-rubber tube to a glass adapter which fitted into a needle. After the apparatus was assembled the sterile solution of sodium citrate was aspirated through the needle and rubber tubing and into the flask, and the tubing was pinched off until the needle was inserted in the vein. This minimized the tendency to clotting which occasionally occurred in the collecting-tube. The flask was calibrated with a scale on the side so that the volume of blood mixture could be measured. When the dextrose–citrate mixture was used the dextrose solution was autoclaved in the collecting-flask.

The donor assumed a supine position on an examining table with the arm supported in abduction by an arm rest. The antecubital fossa was cleansed first with tincture of iodine and

secondly with 70 per cent. ethyl alcohol. A tourniquet was then applied. (The cuff of a sphygmomanometer inflated to a pressure of 40 mm. Hg was found to be more comfortable than the usual knotted rubber tube.) The skin and tissues about the median basilic vein were infiltrated with 2 per cent. novocain through a small needle. When anaesthesia was obtained a needle of large calibre (16 gauge) was inserted into the vein and the blood allowed to flow through the rubber tubing and into the preservative mixture in the collecting-flask. Moderate suction was applied by means of the rubber bulb containing the valve. The blood was mixed with the preservative solution by rotating the collecting-flask gently in the horizontal plane. At the conclusion of the operation the rubber stopper in the collecting-flask was replaced by a sterile plug of cotton-wool and the flask was immediately stored in the refrigerator after a 20-c.cm. sample of blood mixture had been pipetted aseptically into a small pilot flask. The latter container was also placed in the refrigerator and the contents used to cross-match with the blood of prospective recipients, thus obviating the necessity for opening the large flask before transfusion.

One important precaution was found necessary when collecting blood in the dextrose-citrate mixture, to be described later. It was discovered that this preservative solution should be very cold (just out of the refrigerator) when the blood was run into it, otherwise intense haemolysis often occurred within a few hours after collection. It was demonstrated that the erythrocytes swell when suspended in dextrose solutions, and are thus more vulnerable to further osmotic changes induced by contrasts in temperature in various parts of a large volume of blood mixture being cooled.

Preservative Mixtures

Two types of mixture were used. One consisted of 500 c.cm. of blood plus 100 c.cm. of 3.2 per cent. dihydric sodium citrate ($Na_3C_6H_5O_7 + 2H_2O$) in water. In this case the citrate solution was autoclaved in a small flask and aspirated into the collecting-flask through the needle and rubber tubing just before drawing blood.

The other preservative was a modification of the original mixture of Rous and Turner (1916). Those workers had used 500 c.cm. of blood mixed with 350 c.cm. of isotonic sodium citrate solution and 850 c.cm. of isotonic dextrose solution. This was admirable for preserving blood, but the content of sodium citrate was so high that it was necessary to discard the plasma and resuspend the cells in saline or gelatin solution before transfusion could be considered safe. Our modification reduced the concentration of citrate and increased the proportion of blood, so that the mixture could be safely given without discarding any part of it. The mixture consisted of 500 c.cm. of blood, 650 c.cm. of 5.4 per cent. anhydrous dextrose in water, and 100 c.cm. of 3.2 per cent. dihydric sodium citrate in water. The two solutions were autoclaved separately to avoid caramelization of the sugar; the dextrose was conveniently autoclaved in the 1,500-c.cm. collecting-flask, while the citrate was sterilized in a small flask and aspirated into the dextrose just before drawing the blood.

The dextrose-citrate solution was adopted because it was found to inhibit haemolysis much better than did citrate or saline-citrate solutions. There was only 1/25 to 1/50 as much haemoglobin in the plasma at the end of thirty days of storage in the dextrose-citrate solution as in the others. The details of these studies have been published elsewhere (DeGowin, Harris, and Plass, 1939, 1940a).

Period of Storage

The time during which blood may be stored and safely used for transfusion depends upon many factors. One consideration is the amount of haemolysis present. It has been shown that haemolysis in preserved blood is progressive and begins immediately upon storage (DeGowin, Harris, and Plass, 1939, 1940a). It is the impression of many writers that the transfusion of large amounts of extracellular haemoglobin is dangerous. The exact dosage which is toxic and the mechanism of injury are still a moot question, so we have taken as a working hypothesis the assumption that transfusion of enough extracellular haemoglobin to produce haemoglobinuria is undesirable. Accordingly, we have arbitrarily discarded citrated blood after ten days of storage and have used blood in the dextrose-citrate mixture when it has been stored up to thirty days. The data on our transfusion reactions apparently justify these limits as safe.

Another possible danger from the transfusion of blood which has been stored too long has been the high potassium content of the plasma (Scudder, Drew, Corcoran, and Bull, 1939). It is true that during storage some of the potassium of the erythrocytes diffuses into the plasma, but studies in our laboratory (DeGowin, Harris, and Plass, 1940b) have shown that the potassium concentration in plasma approaches a maximum in fifteen days of storage, and transfusion of blood stored for this period has produced no clinical reactions, no increase in the serum potassium of the recipients, and no electrocardiographic changes (DeGowin, Hardin, and Harris, 1940).

Administration of Preserved Blood

When a patient required a transfusion his blood group was determined and his serum and cells were cross-matched with those of a blood of suitable type stored in the refrigerator. The cross-matching was actually performed with specimens from the small pilot flask stored separately from the major portion, so that the latter was undisturbed. The flask of compatible preserved blood was then delivered to the intern, who administered it to his patient. A sterile salvarsan tube of 800 c.cm. capacity was suspended from a suitable support. To this was attached a four-foot length of gum-rubber tubing with glass adapter and needle of 18 or 20 gauge. About 100 c.cm. of sterile 0.85 per cent. sodium chloride solution was first poured into the apparatus and the air bubbles were displaced from the tubing. The needle was then inserted into the recipient's vein and the saline allowed to flow in. In the meantime the blood mixture was gently shaken and poured into the salvarsan tube through a sterile conical wire-mesh filter (about 100 mesh to the inch), upon which were placed several layers of sterile cotton gauze. This effectually held back the small shreds of fibrin and the layer of conglutinated and autolysed leucocytes, which becomes quite tenacious during storage. The blood was allowed to run in by gravity at a velocity of between 5 and 40 c.cm. per minute.

It must be emphasized that no attempt was made to heat the blood mixture before administration. The injection was often begun when the blood was nearly at the temperature of the refrigerator, and no reactions were noted from this procedure. In a separate publication (DeGowin, Hardin, and Swanson, 1940) we have presented detailed studies to show that this practice is harmless and does not lower the body temperature appreciably. This is not only a great convenience, but also saves time in emergencies and excludes possible accidents incurred in attempting to heat the blood (Baker, 1937). It should be particularly useful in the emergencies of military surgery.

The series of 1,604 blood transfusions here reported represent practically all of the operations supervised by the staff of the Blood Transfusion Laboratory from October 11, 1938, until January 19, 1940. The amount of blood given in each transfusion varied from 50 c.cm. for infants to 500 c.cm. for adults. The largest volume

was by far the most commonly used. The total volume of fluid for 500 c.cm. of citrated blood was 600 c.cm. The dextrose–citrate mixture constituted a total volume of 1,250 c.cm. when 500 c.cm. of blood was used. Many recipients received more than one transfusion. The indications for transfusion were chiefly anaemia, serum protein deficiency, infections, and shock.

Influence of Age of Transfused Blood on Incidence of Reactions

Table I contains a detailed analysis of the incidence of various types of transfusion reaction tabulated according to the number of days the blood was stored and the preservative used. The category designated as "0 days" contains the data on 146 bloods which were administered within two hours after collection, and serve here as a control series of fresh blood transfusions.

TABLE I.—*Incidence of Reactions from Transfusion of Blood of Various Ages*

	Days of storage of blood	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	31	36	38	Totals	Per cent. (all ages)	
Dextrose–Citrate Blood	No. of transfusions	7	17	31	50	38	31	20	12	6	11	17	11	10	9	11	13	13	15	8	10	7	6	12	5	4	4	1	3	3	1	1	387		
Reactions	Chills only Number	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.5%	Incidence of all reactions 5.6%
	Chills only Per cent.						3.2	5.0																											
	Chills and fever Number	0	0	0	2	3	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	8	2.0%	
	Chills and fever Per cent.				4.0	7.8	3.2									9.0																			
	Urticaria Number	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.2%	
	Urticaria Per cent.		5.8				6.4												6.6																
	Haemoglobinuria Number	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3		
	Miscellaneous			*a*				*b*	*a*																				*c*				4		
Citrated Blood	No. of transfusions	139	132	157	197	152	127	117	73	50	36	25	6	3	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,217		
Reactions	Chills only Number	0	3	4	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	1.2%	Incidence of all reactions 6.3%
	Chills only Per cent.		2.2	2.5	1.0	1.3	2.3	0.8																											
	Chills and fever Number	4	7	6	4	3	4	3	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	2.9%	
	Chills and fever Per cent.	2.8	5.3	3.7	2.0	1.9	3.1	2.5	4.1		5.5																								
	Urticaria Number	2	4	1	4	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1.5%	
	Urticaria Per cent.	1.4	3.0	0.6	2.0	1.3	1.5	1.7	2.7																										
	Haemoglobinuria Number	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
	Miscellaneous				*a*	*de*		*f*		*e*																							5		

Symbols: *a*, Reaction from injection of distilled water. *b*, Dyspnoea and cyanosis. *c*, Death from cardiac embarrassment *d*, Asthmatic attack. *e*, Epigastric pain. *f*, Death from incompatible blood

The clinician often has difficulty in differentiating between the chills and fever which may be attributed to a transfusion and those which occur in the course of the primary disease but are coincidental with the injection. In case of reasonable doubt such an occurrence was recorded as a transfusion reaction.

The number of transfusions in some categories is too small to be treated statistically, and the minor variations in the percentage of reactions cannot be regarded as significant. It will be noted, however, that there is no striking increase or decrease in the incidence of reactions with longer storage of the blood. The small difference in reaction incidence from blood in the two preservatives is not considered significant.

Chills and Fever from Blood Transfusions

The occurrence of fever persisting for three or four hours and usually preceded by a chill is the most common type of reaction from blood transfusion. This syndrome is also noted during the intravenous injection of solutions of sodium chloride, dextrose, and other parenteral fluids. The work of Seibert (1925), which has been amply confirmed by others, demonstrated that certain bacteria, many of them non-pathogenic, could grow in distilled water and elaborate filterable thermostable substances called "pyrogens," which produce transient febrile reactions when injected intravenously into animals or man. Certainly the manufacture of parenteral fluids and the preparation of apparatus for intravenous use with proper regard for the exclusion of pyrogens have resulted in almost complete elimination of febrile reactions in the hands of most workers.

Some hold the opinion that most or all of the febrile reactions occurring with blood transfusions may be due to the introduction of pyrogens. This may be the cause of the majority of reactions, but chills and fever also occasionally occur coincidently with the appearance of urticarial eruptions and are concurrent with intravascular haemolysis caused by the administration of incompatible blood or distilled water. The role of pyrogens is so well established, however, that whenever blood transfusions are performed rigid precautions should be taken to exclude them.

When the Blood Transfusion Laboratory was organized provision was made for the control of pyrogenic substances. The water used for the manufacture of parenteral fluids and the cleansing of apparatus for intravenous therapy was distilled in one laboratory and used before there was opportunity for organisms to grow in it. The apparatus for the injection of parenteral fluids was identical with that used for blood transfusions. By requiring a detailed report on reactions from each intravenous injection of saline or dextrose solution it was possible to estimate the percentage of febrile reactions occurring in blood transfusions attributable to pyrogens in the apparatus or in the solutions used with the blood. Table II contains the data covering a period from July 1, 1939, to January 1, 1940. It will be noted that during the months of July and August the pyrogenic reactions from parenteral fluids were relatively frequent and contributed correspondingly to a higher incidence in blood transfusions. It was found that the rubber tubing was being cleansed by washing with pyrogen-free water but was allowed to drain for eighteen hours or more before

TABLE II.—*Incidence of Chills and Fever from Intravenous Infusions of Dextrose and Saline compared with that from Blood Transfusions for the Same Time Period*

Month (1939)	Injections of Dextrose and Saline Solutions			Transfusions of Preserved Blood		
	No. of Injections	Reactions		No. of Transfusions	Reactions	
		No	Per cent.		No.	Per cent.
July	1,113	32	2.8	113	7	6.6
August	1,185	12	1.0	133	5	3.7
September	1,397	4	0.2	167	7	4.1
October	1,210	3	0.2	169	4	2.3
November	1,051	3	0.2	140	4	2.8
December	1,225	0	0	229	8	3.4
Totals	7,181	54	0.75	951	35	3.68

being dried and sterilized. This, of course, offered an opportunity for the formation of pyrogens. When the method of cleansing the tubing was changed so that it was dried immediately by compressed air and autoclaved soon afterwards, the incidence of pyrogenic reactions fell to 0.2 per cent. The incidence of chills and fever in blood transfusions, however, has continued to be about 3 per cent. This could be due to: (1) some peculiarity in the blood itself; (2) the introduction at the time of collection of the blood of organisms which live for a few hours, produce pyrogens, and are then killed by the normal bactericidal agents in the blood; or (3) the contamination of the sodium citrate with pyrogens. We are not prepared to choose between these alternatives at the present time. The first two possibilities seem more likely, since one would expect a higher incidence of reactions if pyrogens were distributed uniformly in the sodium citrate. The dextrose used in the one preservative mixture and the distilled water used in the sodium citrate solution came from the same source, as did that employed for the manufacture of parenteral fluids.

Occasionally a patient had a chill or complained of chilly sensations during the injection of saline, dextrose, or blood, but no elevation of temperature ensued. Although there is no proof to justify it, these reactions have been considered as due to pyrogens and have been so counted in Table II.

Urticarial Reactions

While urticaria and angioneurotic oedema have long been considered to be allergic manifestations it is common experience that the causative allergens in many cases cannot be found. Urticaria or angioneurotic oedema was not reported in the series of 7,181 injections of parenteral fluids, but occurred in 1.4 per cent. of the 1,604 blood transfusions. A history of allergic manifestations was requested of all donors and recipients, but the occurrence of urticaria from blood transfusion could not be correlated with previous experience of allergic symptoms. The high potassium content of the transfused plasma did not seem to be a factor, since the reaction occurred as frequently with fresh blood or that stored for only a few days. The donors had not eaten for at least three hours before the collection of blood. The present study sheds no light on the cause of urticarial transfusion reactions.

One interesting case was observed, however—that of a member of the hospital staff who had had angioneurotic oedema, the allergenic cause for which had not been found. Two years later he gave blood to ten different recipients, four of whom developed such severe angioneurotic oedema that the transfusions had to be discontinued.

Haemoglobinuria from Blood Transfusion

In haemoglobinaemia from any cause the extracellular haemoglobin disappears from the blood serum at a rate somewhat dependent on the concentration. Some of it is deposited in the reticulo-endothelial system of the liver and spleen and in the proximal convoluted tubular epithelium of the kidney (DeGowin, Warner, and Randall, 1938). If the concentration of haemoglobin in the serum is sufficient some of the pigment is excreted in the urine. Drabkin, Widerman, and Landow (1935) have shown that only about 10 per cent. of the pigment is disposed of in this manner. Lichty, Havill, and Whipple (1932) demonstrated a renal threshold for haemoglobin in the dog, and more recently Ottenberg and Fox (1938) have shown a similar mechanism in human beings. The relation between haemoglobinuria and the production of anuria is still not settled. The reader is referred elsewhere (DeGowin, Warner, and Randall, 1938) for a discussion of this subject.

There are several possible methods by which haemoglobinuria might result from the transfusion of preserved blood. It has been shown that haemolysis is a steadily progressive process during storage (DeGowin, Harris, and Plass, 1939, 1940a). If enough extracellular haemoglobin is transfused the renal threshold is exceeded and the pigment appears in the urine. This occurred in two patients receiving blood containing respectively 1,665 mg. and 11,840 mg. of extracellular haemoglobin in the plasma. The urine was coloured for a day or so, but no symptoms or jaundice ensued. On the other hand, one patient received 1,822 mg. of free haemoglobin without haemoglobinuria.

The transfusion of incompatible blood may, of course, result in haemolysis, as in the following case:

One patient in our series was a woman belonging to Group O (Type IV Moss) who had received several transfusions of compatible blood without incident. Then through a series of errors in the laboratory she received a transfusion of Group A (Type II Moss) blood. When about 100 c.cm. had been injected she became cyanotic and dyspnoeic, and shock promptly developed. The transfusion was discontinued and a transfusion of 500 c.cm. of Group O blood was administered with only temporary benefit. She died in shock about six hours later. The blood serum and urine contained much free haemoglobin. Post-mortem examination revealed no alternative cause of death.

Another possible method of producing haemolysis is by the transfusion of haemolysins active against the recipient's cells in such high titre that they are not inactivated by dilution in the recipient's plasma. Such an instance was reported by one of us (DeGowin, 1937) in which the transfusion of Group O blood into a recipient of Group AB produced haemoglobinaemia. In the present series two patients belonging to Groups A and AB received preserved blood of Group O and excreted haemoglobin in the urine, but showed no other symptoms. The haemoglobin content of the transfused plasma was determined in advance as 1 mg. and 721 mg. respectively. These concentrations were probably too low to have exceeded the renal threshold, so that the above explanation is at least possible.

The introduction of other haemolytic substances at the time of transfusion offers a further possibility. Through a misunderstanding three patients in one ward received transfusions with a preliminary injection of 100 c.cm. of distilled water instead of physiological saline solution. Before the injection of the blood had begun the patients complained of a feeling of constriction in the chest and

dyspnoea. Two of the three had chills and fever. Only slight amounts of the transfused blood were actually given. No haemoglobin appeared in the urine, but doubtless some intravascular haemolysis occurred.

A fifth mechanism for the production of haemolysis from transfused preserved blood theoretically exists. If the erythrocytes during storage lose some of their ability to withstand trauma it might be expected that many would be promptly destroyed by being forced through the capillaries of the recipient. No exact studies have yet been made on this subject, but it can at least be concluded from our series that the breakdown was not sufficient or fast enough to produce haemoglobinuria.

Jaundice

Icterus often occurs in haemolytic reactions involving fresh blood. It is not proved that the jaundice is entirely due to haemoglobin itself, since the van den Bergh reaction is sometimes "direct" within a day after the accident occurs (DeGowin, 1938). Belk, Henry, and Rosenstein (1939) reported several cases of jaundice in 400 transfusions of preserved blood, and Fox (1939) had fourteen cases in 100 transfusions. Leedham-Green (1939) recorded no jaundice in sixty transfusions; Biddle and Langley (1939) had none in 150 cases. Jaundice was observed only once in our series. This occurred in an infant with septicaemia from haemolytic staphylococci. The icterus was observed some fourteen hours after transfusion. Neither haemoglobinaemia nor haemoglobinuria was present. Further tests showed no incompatibility in the recipient's and the donor's blood. From post-mortem examination the pathologist concluded that the icterus was the result of bacterial haemolysis and of cloudy swelling of the liver due to the infection. The disparity in the incidence of jaundice reported by various workers is difficult to explain. It will not be possible to evaluate this situation until the amount of extracellular haemoglobin injected in every case is known. So far this has seemed impracticable.

Embarrassment of Cardiovascular System

Plummer (1936) reported five deaths from pulmonary oedema following blood transfusions in Charing Cross Hospital. One of us (DeGowin, 1938) added two more to the literature. Both of our patients received compatible blood; one had chronic nephritis and the other had subacute bacterial endocarditis. Murphy, Grill, and Correll (1940) in a recent experimental study have shown that the intravenous injection of relatively small amounts of fluid into patients with potential cardiac failure causes increase in the venous pressure and slowing of the circulation time.

In the present series an infant, aged 2 months and weighing 7½ lb., was brought to the hospital because of malnutrition. Through an error 800 c.cm. of blood–dextrose–citrate mixture was injected slowly into the jugular vein in a period of two hours. The patient became extremely dyspnoeic and cyanotic, and generalized anasarca suddenly appeared. The transfusion was discontinued and the respiratory signs abated somewhat. The oedema persisted. Sixteen hours later 50 c.cm. of blood was withdrawn from the fontanelle, with temporary improvement. The patient died thirty-six hours after the transfusion. Post-mortem examination revealed intense engorgement of all vessels, dilatation of the heart, and marked peripheral oedema. There was only slight oedema of the lungs.

Types of Reaction Distinctive of Preserved Blood

From the tabulation reported in this paper it is evident that no types of reaction were observed from the transfusion of preserved blood which were not already known to be associated with the use of fresh blood. It is obvious that the incidence of haemoglobinuria depends to a great extent upon the preservatives employed and the period of storage.

Summary

Data have been presented on the incidence and types of reaction occurring in a series of 1,458 transfusions of blood stored from one to thirty-eight days and 146 transfusions of fresh blood. No types of reaction were encountered that were distinctive of preserved blood. The incidence of various types of reaction did not increase or decrease with the period of storage of the blood mixtures. A limit of ten days of storage at 3° to 5° C. was found to be safe for citrated blood. Blood stored in the dextrose–citrate mixture described was found to be safe for transfusion after thirty days of storage. A comparison of the incidence of pyrogenic reactions in a series of 951 blood transfusions with that in a series of 7,181 parenteral injections of saline or dextrose showed that about 3 per cent. of the febrile reactions from the blood transfusions could not be attributed to pyrogens in the apparatus or fluids used. This comparison did not exclude the possibility of the introduction of pyrogenic organisms at the time of the collection of the blood. The presence of pyrogens should be suspected when the incidence of febrile reactions is high. There were two deaths from transfusions—one from incompatible blood and one from cardiac embarrassment. Neither of these could be attributed to the use of preserved blood in contradistinction to fresh blood.

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Lord McGowan, Chairman of Imperial Chemical Industries, in his presidential address to the National Safety First Association last month, said: "A lost-time accident in a factory should be regarded as much a gain to the enemy as a casualty in the armed Forces." The Government's recognition of the importance of accident prevention is shown by the inclusion of safety as one of the subjects to be covered by the Factory and Welfare Advisory Board of the Ministry of Labour and National Service. Industrial accidents constitute a serious brake on production to meet the needs of war. Speeding up of processes and a huge influx of new and untrained employees into industry have enormously increased the risk of accidents. There has been a heavy crop of minor casualties, accompanied by an unduly high proportion of septic cases due to failure, especially of new workers, to realize the importance of immediate and proper first-aid treatment. The Industrial Welfare Society and the National Safety First Association (52, Grosvenor Gardens, S.W.1) provide a joint accident prevention service for industry. The latest addition is a booklet specially designed to draw the attention of new employees to the fundamentals of works safety.

PREVENTION OF ACUTE FAILURE OF CIRCULATION FOLLOWING INJURIES TO LARGE ARTERIES

EXPERIMENTS WITH GLASS CANNULAE KEPT PATENT BY ADMINISTRATION OF HEPARIN

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The results of vascular surgery have been improved by the clinical use of heparin (Murray, 1940). As many war wounds involve large blood vessels it is probable that vascular surgery will play a more important part in the treatment of such injuries in the future. In the last war many limbs and lives were lost because of extensive infection and gangrene. It seemed attractive, therefore, to investigate the possibility of a simple method that might prevent the acute failure of circulation following injuries to large arteries. If by such simple

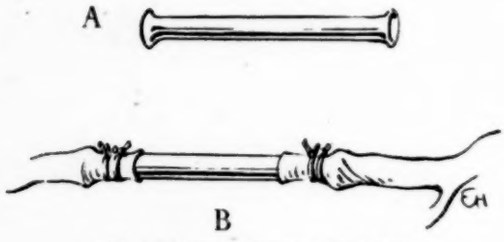

FIG. 1.—Approximately actual size.

method adequate circulation could be maintained up to twenty-four hours, until the patient could be transported to a hospital with better operating facilities, permanent repair of the injured vessel or the bridging of a gap by a venous graft might be carried out, or collateral circulation might become established. Tuffier's (1915) tubes were employed for this purpose, but failure of circulation usually occurred from rapid plugging of the tube and the adjacent segments of the vessel. It was hoped, therefore, that by using heparin better results might be obtained.

Experiments were carried out to test the effectiveness of heparin in preventing plugging of such tubes and blood vessels over varying lengths of time. The dosage of heparin necessary to obtain this result was also investigated. In these experiments glass cannulae with a bore 1.5 to 2 mm. and a length of 3.5 cm. were inserted between the cut ends of the common carotid artery of dogs. The ends of the cannulae were slightly flared. The cut ends of the artery were drawn over the flanges and secured by means of linen ligatures. Fig. 1 illustrates this procedure. Without the use of heparin these tubes became plugged within twenty minutes, on the average, following the re-establishment of circulation through these cannulae.

Results

The table, summarizing the results of fifteen experiments on fourteen dogs, shows the different amounts of heparin and saline given. An average of 56 units per kg./hr. was used, but this was considerably more than was necessary in many of the animals. This high figure is partly accounted for by the large initial dose of heparin given before the continuous intravenous injection was started, and another large dose administered immediately before the specimen was recovered. When a satisfactory continuous intravenous injection of heparin was given, 55 units per kg./hr. was enough to raise the clotting time of an animal from the normal of two minutes to thirteen minutes or more. This sufficed to keep the cannulae patent in all experiments. The method of estimating the clotting time both experimentally and clinically is illustrated in Fig. 2.

With excessive dosage of heparin there was fairly extensive oozing from the operative field in some of these experiments, but when the clotting time was kept at a level of thirteen minutes there was little if any oozing. If the experiments on thrombin (Warner *et al.*, 1939) continue to show that this substance will prevent oozing from operative fields it might be used to advantage by surface application on surgical wounds in patients who are receiving heparin.

Table giving Results of Experiments

Exp. No.	Dog No.	Weight (Kg.)	Heparin (Units)	Saline (c.cm.)	Aver. No. Units of Heparin per c.cm.	No. of Hours	Result	Units per Kilogramme	Remarks
1	78	10	21,800	1,800	12	71	Cannula *not* patent	30	
2	79	9	20,150	1,650	12	72	" "	31	
3	82	11	10,000	500	20	24	" "	38	
4	46	—	34,250	1,350	25	76	Cannula patent	—	Unfortunately this dog's weight was not obtained. It was a large animal
5	23	6	17,000	600	28	24	" "	118	
6	65	10	14,100	900	16	44	" "	32	Observed at necropsy
7	85	12.5	26,500	1,000	26.5	24	" "	85	
8	83	8	12,600	430	29	24	" "	65	
9	83 (Other common carotid)	8	8,100	300	27	24	" "	42	
10	84	12	18,500	800	23	14	" "	110	Died as result of massive oozing from operative site
11	87	6	—	—	26?	12	" "	—	Died from same cause as above; too much heparin
12	90	12	12,000	500	24	20	" "	42	
13	92	9	8,500	300	28	24	" "	39	
14	D	10	7,000	200	35	23 h. 10 m.	" "	30	Dog had also been heparinized the day previously
15	97	10	12,000	400	30	24	" "	50	
								Av. 56	

The heparinized saline was administered according to the continuous intravenous technique of Jacobs (1931).

As this procedure has not been carried out in clinical patients, and as the dose required to heparinize a dog differs from that required to heparinize a patient, it is difficult to predict the dosage accurately. From our experience we would suggest that between 15 and 20 units per kg./hr. should be adequate. Since continuous intravenous administration is impracticable in patients outside hospitals, the intermittent intravenous injection of the heparin in doses of 1,500 units q.h. for the patient of average weight should suffice.

Consideration of this experimental evidence suggests that it might be possible to insert glass cannulae in torn

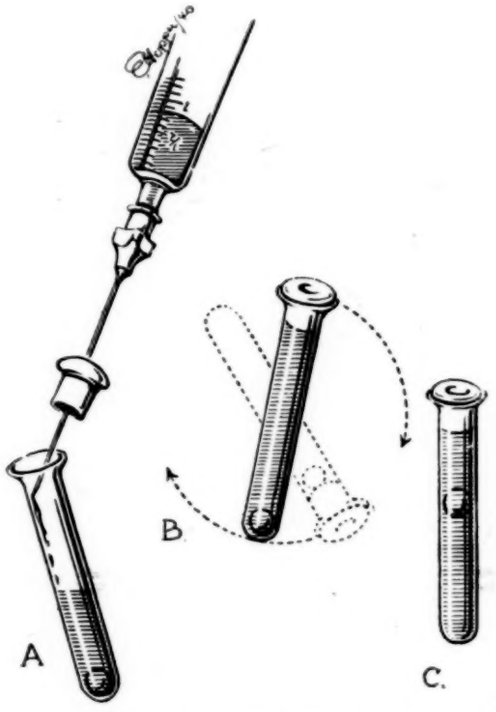

FIG. 2.—Approximately half actual size.

arteries soon after the accident. With suitable doses of heparin the cannulae might be kept patent until the patient could be removed to a hospital where repair of the vessels could be undertaken. This might be carried out with the simplest technique in advanced dressing stations behind the fighting line. In this way some of the disastrous effects of acute failure of circulation in extremities and neck might be prevented.

Summary

With a view to using glass cannulae to bridge defects in the arterial system of human beings as a temporary measure a series of experiments have been carried out on dogs. The results have been tabulated. With adequate heparinization, using a pump to provide continuous intravenous administration, glass cannulae of 1.5 to 2 mm. bore and 3.5 cm. length may be kept free from clot for varying periods of time up to seventy-six hours. The danger of oozing from the operative field in overdosage with heparin must be borne in mind.

The financial assistance of the Banting Research Foundation in carrying out this research is gratefully acknowledged.

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LEPROSY CASES IN THE BRITISH ISLES

BY

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At the request of the Medical Committee of the British Empire Leprosy Relief Association a subcommittee consisting of the three of us have carried out an inquiry into the number of leprosy cases seen during the last thirty years by dermatologists in all parts of the country. The following is an analysis of replies received to a circular letter which enclosed forms to cover the required information. These were received from fifty specialists, only fourteen of whom had seen any cases of the disease. The great majority were reported by Dr. J. M. H. MacLeod (to whom we are particularly indebted for his reports of cases) from the St. Giles Homes in Essex and private cases, and by two of us (Sir Leonard Rogers and Dr. E. Muir). All but six cases had been seen in London, doubtless due to so many patients from over-seas visiting London for medical advice. The provinces therefore show very few cases, although no doubt there are some regarding which no information has been received. Concealment is likely to be less common than it was two decades ago now that it is generally known that treatment of value is available to those seeking it in good time.

Countries of Origin.—It will be seen from the data in Table I that no fewer than thirty-five of the seventy-

TABLE I.—*Countries in which the Disease was Apparently Acquired (87 Cases)*

Europe: British Isles 4, Malta 1, Norway 1, Russia 1	7
Asia: India and Burma 35, Malaya 9, East Indies 2, China 3	49
Africa: S. Africa 5, S. Rhodesia 1, Zanzibar 1, Nigeria 2, Egypt 1 ..	10
Western Hemisphere: West Indies 5, British Guiana 4, Colombia 1, Brazil 2	12
Doubtful: "Abroad" 6, unrecorded 3	9

eight cases regarding which information is available came from India, including Burma—doubtless owing to the large number of Europeans and to the high incidence of leprosy in that densely populated country. Malaya was next, with nine cases.

Cases Apparently Contracted in the British Isles.—These number only four in thirty years, all of which were seen from eleven to twenty years ago, and were reported by Dr. J. M. H. MacLeod. In each of these there was prolonged close contact with a highly infective lepromatous case; one was a conjugal infection, and the other three patients were first seen when respectively 12, 15, and 18 years old, indicating infection at the early susceptible age. On account of lower susceptibility in adults conjugal leprosy infections are far less common, and we know of several highly infectious patients who have been faithfully nursed by devoted wives for a number of years in this country without transmitting the disease. No case is known to us of infection in the British Isles from a neural or a tuberculoid case, in which leprosy bacilli are very few and are difficult to find.

Classification of the Cases

In Table II the eighty-seven cases (after excluding duplicates returned by more than one specialist) are classified into different types and arranged to bring out the number still alive and resident in this country. These are subdivided into the little-infective neural and tuberculoid and

TABLE II.—*Cases of Leprosy seen in Recent Decades by British Dermatologists*

	Lepromatous and Mixed	Tuberculoid	Neural	Type Doubtful	Totals	
Former cases:						
1. Dead	16	—	7	—	23	47
2. Repatriated	6	—	7	—	13	
3. Last seen over 10 years ago	3	—	7	1	11	
Little-infective living neural and tuberculoid:						
4. Last seen under 10 years ago	—	—	4	—	4	18
5. At present under observation	—	1	11	2	14	
Infective living lepromatous cases:						
6. At present under observation	18	—	—	—	18	22
7. Last seen under 10 years ago	4	—	—	—	4	
Totals	47	1	36	3	87	

the more dangerous lepromatous or cutaneous cases. Those styled "mixed" are included under the more infective lepromatous type, as bacilli may be numerous.

In Table II, lines 1 to 3 show respectively those already dead, those repatriated, and those presumed to be dead or to have passed into a little-infective stage. Those in Category 3 were last heard of from ten to upwards of thirty years ago. The presumption of death after that period is considered justifiable in patients of the lepromatous type, for no fewer than eleven out of thirteen such patients regarding whom information is available had died within one to eight years of being first seen. The whole of the cases in lines 1 to 3 may thus be regarded as no longer of any danger to the community.

Lines 4 and 5 show little-infective neural cases, including one with tuberculoid lesions. They are still alive, or presumed to be alive, because they were last seen less than ten years ago. In view of the fact above recorded, that no such case has been known to cause infection in this country, they present very little danger to the British community, although in rare instances abroad neural cases have been known to pass into a more infective type.

Lines 6 and 7 each show infective lepromatous cases, those in the former line being known to be alive and in this country, and those in the latter being presumed to be alive as they have been seen within the last ten years. They number eighteen and four respectively, giving a total of twenty-two; they require further consideration.

Living Conditions of Infective Lepromatous Cases

These are shown in Table III, which brings out the following points: Of the twenty-two, five were safely accommodated at the St. Giles Homes; of two more it is reported that one is "strictly segregated" and the other is also isolated at home, "keeping absolutely to himself

TABLE III.—*Conditions of Living of the Infective Lepromatous Cases*

Isolated at the St. Giles Homes in Essex	5
Isolated with careful precautions at home	2
Reached a quiescent little-infective stage	2
Seen at the Tropical Diseases Hospital	4
Under expert care and treatment	5
Conditions unsatisfactory	4

and taking every precaution against dissemination" of his disease; in two more the disease has reached a quiescent and little-infectious stage under treatment; four others were seen at the Hospital for Tropical Diseases, London, and will doubtless have received full instructions regarding the necessary precautions; and a further five are under the highly expert care and treatment of London specialists. In the remaining four the living conditions were not regarded as very satisfactory. The first was reported in 1929 to be residing in a flat with his wife and a young maid during an attack of leprotic fever. The second, a Eurasian subject, was living in the provinces unsegregated. The third was living five years ago with his wife and adult daughter, aged respectively 55 and 35. With these four exceptions the infective cases appear to be well cared for and of little danger to the British community.

Conclusions

We conclude from the above data that the present position is reassuring in view of the fact that nearly all the cases of the infective type are under expert care. Moreover, the danger of infection under the good hygienic conditions of Great Britain is much diminished by the fact that the great majority of the repatriated patients are of a social position that permits them to live under favourable sanitary arrangements and to avoid overcrowding. Further, many of them have reached an age when they are unlikely to come into close and prolonged contact with children, who are considered particularly susceptible. We are, however, of the opinion that all infective lepromatous patients who are not in a position to carry out effective home isolation with absolute prohibition of close contact with children should, so far as is possible, be accommodated at the St. Giles Homes. If necessary, Government funds should be made available for effecting this purpose.

CHEMOTHERAPY OF GONOCOCCAL INFECTIONS IN WOMEN AND CHILDREN

BY

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In the past two years the results of chemotherapy of gonococcal infections in the male have been fully reported, but comparatively little has been published on the chemotherapy of gonorrhoea in the female. In this paper are discussed the methods adopted and the results obtained in three series of cases: (1) gonorrhoea in adult women—104 cases, mostly out-patients; (2) gonococcal vulvovaginitis in children—twenty cases, all in-patients; (3) gonococcal ophthalmia in infants—twenty cases, all in-patients.

1. Gonorrhoea in Adult Women

Of the 104 cases treated, forty were early acute cases, twenty-seven subacute, and thirty-seven chronic. The majority of patients were from 20 to 35 years of age. Three had abscess of Bartholin's glands, two had acute salpingitis, and two had both syphilis and gonorrhoea.

During a preliminary trial period efforts were made to determine the best time to start chemotherapy, the most effective daily dosage, and the optimum length of treatment. In one group of acute cases the drug was withheld for the first week to allow development of some degree of natural immunity. In another group the drug was administered at once in a dosage of 2 grammes daily for ten to twelve days; while in a third group a smaller daily dosage was given for seven to ten days. The method which seemed to us to give the best results was the administration of one tablet (0.5 gramme) of sulphapyridine (M & B 693) four times daily after food for one

week, starting as soon as the diagnosis of gonorrhoea was made; and this was adopted as routine. In addition, local treatment was carried out, consisting of the application of 10 per cent. protargol to the urethra and cervix. This was given from the start daily until the onset of the menstrual period following cessation of the drug, and thereafter once or twice weekly for another month. For the next four weeks examination was made once weekly, and local treatment was applied only if discharge or congestion persisted.

Reactions to Sulphapyridine

Patients did not complain unduly of any ill effects, and in point of fact complaints were seldom elicited except after leading questions. Inquiry as to these side-effects was made as a precautionary measure against the unknown risks of giving such a potent drug to ambulant patients. The chief discomforts occurring were nausea (twenty-two cases), headache (nine cases), and drug rash (seven cases).

Nausea was reported on the third or fourth day of treatment, and was relieved in nineteen of the twenty-two cases by giving half a drachm of sodium bicarbonate along with the drug. In two of the three cases not so relieved a reduction in dosage to half a tablet six times a day overcame the nausea; but in the third case this measure failed, and the use of the drug had to be abandoned. Headache was synchronous in onset with the nausea, and it passed off spontaneously within forty-eight hours. It was never severe enough to require reduction of dosage or special measures for its relief.

Skin eruptions were few, and were mostly scarlatiniform. Generalized pruritus and oedema of the face were common accompaniments. The dermatitis began on the ninth day in every case. In two instances the rash appeared two days after the administration of the drug had ceased. In the others treatment had been continued for nine days, with a total dosage of 36 tablets (18 grammes). Invariably the condition called for no special treatment and cleared up rapidly on withdrawal of sulphapyridine. In one case, early in the series, marked herpes oris developed, and the drug was stopped. In the light of later experience it seems probable that the herpes was not caused by the sulphapyridine.

Results of Treatment of Gonorrhoea

Progress was noted by examination of daily smears from the urethra and cervix during administration of the drug, and of weekly smears up to the second menstrual period thereafter. Subsequently—that is, after cessation of local treatment—smears were examined after the three following menstrual periods. The standard of cure required was that all of these following the week of treatment with sulphapyridine should be negative. Nine cases of the series defaulted before observation had been completed, but eighty-three of the remaining ninety-five (87.4 per cent.) fulfilled these requirements—a highly satisfactory rate of cure. In twelve cases the result was unsatisfactory (Batchelor, Lees, Murrell, and Braine, 1938). A study of these twelve cases shows that: (1) inadequate dosage due to either intolerance or faulty attendance for treatment was responsible for the unsatisfactory result in four cases; (2) relapse occurred after local treatment had been missed for several weeks in one case; (3) there was no response whatsoever to the drug in three cases; (4) after being negative during the administration of the drug and remaining satisfactory for varying lengths of time the gonococcus reappeared in spite of local treatment in four cases.

The further treatment of the unsatisfactory cases was as follows:

1. In four another course of sulphapyridine was given with poor result.

2. In four a mixed gonococcal vaccine was used with good result. The vaccine employed was the St. Mary's mixed gonococcal vaccine; small doses, starting at 0.2 c.cm. and increasing gradually, being given twice weekly until a dose of 1 c.cm. was reached. This dose was repeated at weekly intervals for three weeks.

3. In one case which relapsed after a second course of sulphapyridine and mixed gonococcal vaccine, a course of albucid (*p*-aminobenzene-sulphonacetamide)—one tablet six times daily for one week, accompanied by a mixed vaccine twice weekly—led to a satisfactory result.

4. In the remainder of the cases local treatment only was employed.

Treatment of Gonococcal Complications

In these the effect of sulphapyridine was striking. It was found that the complications cleared up without any treatment other than administration of the drug. This was noted in the three cases of Bartholinian abscess and the two cases of acute salpingitis. In the former cases smears were negative within one week and the glands were impalpable within two weeks from the beginning of treatment. In none of them was incision or aspiration of pus found necessary. In the cases of salpingitis symptoms and signs cleared up within four days of starting treatment, although the cervical smears remained positive until immediately after the next menstrual period. Thereafter the smears were negative.

In the series there were two cases in which the presence of a double infection was noted. A very interesting point arose with regard to the possible effect of the drug on the appearance of the primary sore. In one patient, on the first examination, gonorrhoea was found to be present, and there was also a vulval sore not resembling a hard chancre. Treatment with sulphapyridine was begun at the outset. Examination of the serum from the sore by dark-ground illumination at the first visit was negative, as was the Wassermann reaction. Subsequent daily examinations of serum from the sore by dark-ground illumination were negative, and yet she developed a W.R. ++ and a maculo-papular rash five weeks from her first visit.

The second patient was referred for examination through her husband, who had a primary sore and acute gonorrhoea. At her first visit cervical and urethral smears were positive for the gonococcus, but there was no evident sore and her Wassermann reaction was negative. Treatment with sulphapyridine was begun at once. She was examined very carefully at each subsequent visit, and a Wassermann test was made fortnightly, with negative result. No sore was evident at any time either on the vulva or the cervix, and yet her Wassermann reaction was ++ two months after her first visit. On experimental syphilis in animals sulphapyridine appears to have no inhibitory action, and it may well be that the drug was not responsible for the atypical character of the syphilitic infection in our two patients; but these cases at least serve to emphasize the necessity for late serological tests for syphilis in all female cases of gonorrhoea undergoing chemotherapy.

2. Gonococcal Vulvovaginitis

The dosage of sulphapyridine was dependent on the age and development of the child, varying from a quarter-tablet four times daily for one week in infants under 3 months to a half-tablet six times daily for one week in

the older girls. This was accompanied by daily vaginal swabbing with 10 per cent. protargol and the application of dermatol powder. The average duration of local treatment (in the beginning daily, and latterly weekly) was four months, while the limits were three months and nine months. The children remained well while the drug was administered, and no complaints were made.

The results in the twenty cases of the children's series were much less gratifying than in the adult group. Only eleven cases were classified as satisfactorily cured; seven cases were regarded as unsatisfactory and requiring further treatment. In three of these a second course of sulphapyridine gave a satisfactory result; in a fourth the third course was found effective; while in another two a mixed vaccine led to a cure (Brown, 1939). Our experience suggests the advisability of giving as a routine in all cases of gonococcal vulvovaginitis two courses of sulphapyridine separated by an interval of ten days or a fortnight.

3. Gonococcal Ophthalmia

In hospital twenty cases of gonococcal ophthalmia have been treated with sulphapyridine. The routine adopted was a quarter-tablet four times daily, given with sodium bicarbonate. This was supplemented by irrigation with normal saline, the frequency of this depending on the severity of the case, the average being four-hourly. Smears from all the cases were negative within four days, even in two which had failed to respond to local treatment and protein shock. In none of the cases was there any relapse: after the smears became negative they remained so. Tablets were discontinued forty-eight hours after the smears became negative. A total dosage of 3 grammes sufficed in every case. Given crushed in milk to which a pinch of sodium bicarbonate was added, the drug caused no signs of intolerance.

Discussion

A general survey of the effects of sulphapyridine brought out several points of interest:

1. The effect of the drug does not appear to be dependent on the particular strain of the organism, as was believed at an earlier stage. This point was illustrated in three sets of patients: (*a*) Where husband and wife received treatment at the same time, the husband having infected his wife and both seeking treatment immediately. The response in the case of the wife was very satisfactory, but the husband's case was classified as a failure at the male clinic, although he showed no intolerance to the drug and had had a very adequate dosage. (*b*) Two instances where mother and child received treatment at the same time. In one the child responded and the mother did not; in the other the mother responded while the child did not.

2. Acute and chronic cases responded equally well to the treatment. Of the thirty-seven chronic cases four were failures, while a similar number of failures were found among the forty acute cases.

3. Response to the treatment is rapid, smears becoming negative between the second and fifth days. Continued administration beyond one week did not appear to have any added advantage. Where rapid improvement failed to show itself there was little likelihood of subsequent response. Prolongation of treatment beyond the period indicated increased the probability of ill effects without any added benefit. This is illustrated by the skin manifestations. Of the seven cases four occurred where the drug was continued beyond one week.

4. In the case of the children it was found that although they were in hospital the results were sometimes very disappointing. The reason for this appeared to be that the interval between the last dose at night and the first in the morning was too long. The results were much improved when the last dose was given later at night, thus maintaining a more uniform concentration of the drug in the blood (Marshall, Cutting, and Emerson, 1938).

5. The persistence of the positive cervical smear in the case of salpingitis suggested that the giving of the course of treatment during the menstrual period might lead to even better results, especially in the chronic cases.

Summary

In the treatment of gonorrhoea in the adult female the administration of sulphapyridine is a great advance on the older methods. In the present series 87.4 per cent. of the cases were cured in a very much shorter period than was previously possible.

In children suffering from vulvovaginitis the results are less encouraging.

With the dosage used the ill effects of the drug are infrequent and of no great severity.

In the treatment of complications of the infection in adults no measures other than the administration of sulphapyridine are necessary.

No failures have occurred in the treatment of gonococcal ophthalmia with sulphapyridine.

I am indebted to Dr. A. S. M. Macgregor, medical officer of health, Glasgow, for permission to publish this paper and for the facilities he gave me in producing it.

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TUBERCULOSIS OF THE KNEE

A FOLLOW-UP INVESTIGATION OF OLD CASES

BY

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An investigation of old cases of tuberculosis of the knee treated at the Robert Jones and Agnes Hunt Orthopaedic Hospital was made for presentation to the British Orthopaedic Association at Oswestry in May, 1939, and a summary of the results obtained has been included in Professor Girdlestone's book *Tuberculosis of Bone and Joint*, recently published. Owing to the tracing of a few additional patients the figures in this paper differ slightly from those originally presented.

The object of the investigation was to follow up old cases only, and it was decided that no patient with a history of less than five years should be included. The period 1920–34 was chosen, and all the cases investigated were first admitted to the hospital during that period, though the onset of the disease in many was prior to that time. Between 1920 and 1934 inclusive 2,922 patients suffering from bone and joint tuberculosis were admitted to the hospital, and included in this number were 322 cases which were diagnosed as tuberculosis of the knee. This represents an incidence of 11 per cent. The task of tracing all these patients, most of whom were scattered throughout the length and breadth of the country, was

found to be too great, and the investigation was therefore limited to 150 cases picked at random. Of this number twenty-six in which the diagnosis was probably incorrect were discarded, leaving 124 in which the diagnosis appeared to be justified.

Sundt (1931), among many authors, points out the difficulties of certain diagnosis, and comes to the conclusion that many cases are wrongly diagnosed as tuberculosis of the knee. Nevertheless Girdlestone (1932), as the result of his questionary to the leading orthopaedic surgeons of the world, found that the majority still rely on clinical findings. In the present series positive proof—that is, by the finding of tubercle bacilli or tuberculous tissue under the microscope—was obtained in only twenty-seven cases (22 per cent.). This low proportion of positive findings is due to the fact that material was relatively infrequently sent for examination—the surgeon being content with clinical and operative evidence—and not because negative reports were obtained. At the present time any available material is examined as a matter of routine, and in doubtful cases biopsy of the knee-joint or inguinal gland is often performed. Biopsy was not undertaken in any of the cases investigated, and it should be recognized that their diagnosis was based on clinical evidence.

For purposes of investigation and analysis the cases have been grouped under three headings—namely, the three types generally described: (1) *synovial*, in which there is no evidence of focal bone change; (2) *focal-articular*, in which there are focal bone changes involving the joint; (3) *focal-extra-articular*, in which there is a focal bone lesion not involving the joint. Cases have been classified according to their type on admission to hospital, and not according to the type to which they may have ultimately progressed. Table I shows the number and percentage of each type, together with the age of onset and the number of years under observation from the time of onset.

TABLE I

Type	Number	Age of Onset	Number Traced	Observation Period
1. Synovial	37 (30%)	1–22 (7)	33	5–29 years (10)
2. Focal-articular ..	78 (63%)	2–62 (19)	70	5–56 years (16)
3. Extra-articular ..	9 (7%)	1– 8 (3)	7	6–18 years (10)
Total	124	1–62 (14.5)	110	5–56 years (13)

The figures in the last column represent the time in years from the onset of the disease up to the time when last traced, the figures in parenthesis being averages. In the majority of cases the onset was between 1920 and 1934, but in a few the onset was many years before admission. It will be noted that in the focal-articular group the period extends to fifty-six years; this is because a man who was first treated by Hugh Owen Thomas in 1883 still attends the out-patient department. Of the 124 patients 110 (88 per cent.) have been traced either to the present day or to their death.

Type 1: Synovial

Thirty-three patients have been traced; one of them has died of phthisis, the remainder being alive and in most cases well. In only one is the disease still active (five years after the onset), while in the others the disease is regarded as cured or quiescent. In ten (30 per cent.) there is a full range of movement and the joint is functionally normal; in 8 (24 per cent.) limited painless movement varies from 20 to 100 degrees; while in six (18 per cent.) unsound ankylosis is present. Among these cases with limited movement are a number which began as synovial tubercle and later progressed to Type 2 by involving the bone. Fifteen out of the thirty-three Type 1 cases (45 per cent.) progressed in this way, and it is surprising to note how long it may be before this change occurs. The average length of time from the onset until focal bone changes appeared was three years, and in one case it was as long as ten years. Seven of these cases were treated by excision, six of which resulted in bony ankylosis, the seventh in non-union. In the remaining case to be accounted for amputation was necessary following a road accident, and was in no way due to the disease.

TABLE II.—*End-results in Type 1, Synovial Tuberculosis*

Full range of movement	10 (30%)
Limited range of movement	8 (24%)
Unsound ankylosis	6 (18%)
Bony ankylosis (arthrodesis)	6 (18%)
Amputation	1 (3%)
Disease still active	1 (3%)
Died	1 (3%)

In addition to the patient who died of pulmonary tuberculosis two developed tuberculous lesions elsewhere in the body—one in a metatarsal and the other in a kidney.

There is one other point of interest. Alteration in growth of limbs affected by synovial tuberculosis was found in fifteen cases in the absence of focal bone changes, and among these cases lengthening occurred twice as often as shortening. Lengthening from half an inch to two inches was present in ten and shortening from three-quarters of an inch to two inches in five.

Type 2: Focal-articular

Seventy cases of Type 2 have been traced, and the first striking feature in this group is the high mortality. Fifteen (21 per cent.) have died, and eleven of these deaths were due to other tuberculous lesions; miliary tuberculosis, meningitis, and phthisis accounting for the majority. In nearly all these cases, together with seven patients still alive who have developed other tuberculous lesions, the knee was the primary lesion demonstrated. This type of tuberculosis of the knee, unfortunately the commonest, must therefore be regarded as a very dangerous disease.

Among the fifty-five living patients four have evidence of active disease in the knee-joint, which in each case is unsoundly ankylosed, one of them following excision. The remaining fifty-one cases show no sign of active disease. Thirty-two of these have sound ankylosis following excision, and seven following conservative treatment; five, including one excised, have unsound ankylosis; and three cases have a good range of movement in the joint. One of the latter has a full range of movement, but it is possible that the disease was localized to the patella, and never involved the joint surface at any stage (in other words, was really a Type 3 case). In the remaining four living patients amputation was necessary. The end-results are summarized in Table III.

TABLE III.—*End-results in Type 2, Focal-articular Tuberculosis*

Movable joint	3 (4.3%)
Unsound ankylosis; quiescent	5 (7%)
Unsound ankylosis; active	4 (5.7%)
Sound ankylosis; arthrodesis	32 (45.7%)
Sound ankylosis; conservative	7 (10%)
Amputation (still living)	4 (5.7%)
Died	15 (21%)

It should be noted that the figures in Table III (as in Tables II and IV) represent end-results only. The four amputations, for example, refer to patients who are alive at the present day, but this does not mean that only four amputations were performed. There were, in fact, four more amputations among the patients who died, but the question of treatment is reviewed at the end of this paper.

Type 3 : Extra-articular

This type is much less common than the other two, constituting in this series 7 per cent. of the total. In most the lesions involved both metaphysis and epiphysis, the site being the lower end of the femur in five and the upper end of the tibia in four. In five of the seven cases traced the lesion healed without involving the knee-joint, three having a full range of movement and two about half the normal range. It is possible that one of the latter patients may yet develop a full range of movement, as much of his stiffness is due to the fact that he is now being treated for tuberculosis of the hip. In the remaining two cases the disease spread to the joint, one resulting in ankylosis and the other ending in the death of the patient following spread to the spine and kidney.

TABLE IV.—*End-results in Type 3, Extra-articular Tuberculosis*

Healed without invading joint		5 (71.4%)
Full movement	3	
Half normal range	2	
Invaded knee-joint		2 (28.6%)
Bony ankylosis	1	
Died	1	

These results support the findings of Pouzet (1929), who showed that this type of lesion on the whole does well.

Note on Treatment

By far the majority of Type 1 cases were treated conservatively on a Thomas splint, and excision was considered only in those which progressed to a focal-articular lesion. Even in the focal-articular group conservative treatment was in nearly all cases carried out first in order to increase local and general resistance before excision, or until the patient was considered old enough for excision. In the whole series the youngest age for arthrodesis was 14 and the oldest 63. Excision was carried out in fifty-six cases of both types. Three patients died too soon for observation of the result and five others have not been traced. Of the remaining forty-eight bony ankylosis occurred in forty-five (94 per cent.)—though re-excision was necessary in four of them—and non-union in three.

It is interesting to note that, following excision, bony union may occur after a delay of several years. In one case, that of a woman aged 34, the knee was excised in 1932 and re-excised in 1933, but bony union did not take place until 1938. In a second case, that of a youth aged 19, the knee was excised in 1932 and, owing to non-union, re-excised in 1934. In spite of prolonged fixation in plaster and a calliper, radiographs continued to show no sign of bony fusion until 1938, when he was readmitted owing to the development of tuberculosis of the spine. He was treated on a frame, and after nine months radiographs showed sound bony fusion of the knee.

Excluding one synovial case requiring amputation owing to an accident, amputation was performed eight times (6.4 per cent.). This is a surprisingly high figure, and all the more so when it is known that not one was performed because of old age, but all because of the local condition. The ages, in fact, ranged from 17 to 29 (average 23). Four of these patients died, and four are alive and, with the exception of the one who is now being treated for tuberculosis of the spine, well.

In the Type 3 group only two patients were subjected to operation—namely, evacuation of the abscess cavity—and both these now have a full range of movement. On the other hand, three cases healed without operation and without involving the joint, so that it is difficult to conclude whether operation is advisable or not. At any rate, operation does not appear to be necessary unless radiographs show evidence of a spread of the lesion towards the joint.

The only other form of operative treatment undertaken in this series was excision of the patella in one focal-articular case in which the lesion appeared to be confined to the patella. This patient still has an unsound ankylosis after twelve years, but there is no evidence of active disease.

Summary and Conclusions

124 cases of tuberculosis of the knee have been investigated, and 110 of them traced over periods ranging from five to fifty-six years from the time of onset (average thirteen years). The end-results are summarized, and the methods of treatment analysed.

The following are the more important facts which emerge: (1) Tuberculosis occurs in the knee in about 11 per cent. of all tuberculous bone and joint lesions. (2) Synovial tuberculosis progresses to definite bone changes in 45 per cent. of cases. (3) There is a high mortality due to other tuberculous lesions in the focal-articular type. (4) The extra-articular lesion on the whole does well.

I wish to thank the many tuberculosis officers throughout the country who so generously assisted in tracing patients and providing information about them.

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Clinical Memoranda

Treatment of the Impacted Shoulder

The operation of evisceration has never been popular in Great Britain, with the result that it is only briefly mentioned in maternity teaching hospitals; decapitation, however, is dilated upon at great length. I hope to show that evisceration, which is easy and safe, has a definite, though limited, place in midwifery, and that it should replace the difficult and dangerous operation of decapitation. The only adverse criticism of evisceration that I have met is that it is a very tedious and laborious operation.

The advantages of evisceration are as follows:

1. Evisceration can be performed by any medical practitioner, as it is easy and safe; decapitation requires two assistants and special obstetrical experience.

2. General anaesthesia is essential for performing decapitation; it is unnecessary for evisceration.

3. In decapitation there is a certain amount of intra-uterine manipulation, with the risk of rupturing the uterus; in evisceration the operation is carried out in the vagina.

4. There is, too, the danger of the hook damaging the maternal soft parts. This accident has occurred on several occasions.

5. There is also the risk of the sharp projections of the severed vertebral column injuring the maternal soft parts.

6. After decapitation the head may be difficult to deliver; in evisceration the head is still attached to the body, and therefore can be easily delivered in the usual way as an after-coming head.

In performing evisceration a pair of scissors are needed. Traction on the prolapsed arm brings the axillary region within reach and at the same time diminishes the intra-uterine tension. After cutting through the ribs and

removing the thoracic viscera the chest wall sometimes collapses and the breech, followed by the lower limbs, can be easily delivered. At times the removal of the abdominal viscera may be necessary, and occasionally spondylotomy has to be performed, although I have never had to do it.

Finally, in delivering the foetus in this way we are imitating Nature, who sometimes succeeds in delivering cases of impacted shoulder by the so-called method of "spontaneous evolution."

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Retrobulbar Dislocation of the Lens following Double Perforation of Globe

The following case seems worth reporting in view of the unusual nature of the injuries.

CASE HISTORY

A boy aged 13 was indulging in some rough play at school, in the temporary absence of the master, when he accidentally slipped off his seat and impaled his left eye upon the point of a pen held "at the ready" by another boy. The patient sustained a perforating wound of the left cornea, and was brought for examination about three and a half hours later. At this time he was pale, sweating, and profoundly shocked, and he had vomited repeatedly. On examination it was found that the point of the pen had inflicted an oblique perforating wound extending across the cornea from limbus to limbus, dividing the cornea into two sections, one about twice the size of the other. No prolapse of the iris had taken place, but it was extensively adherent to the wound. The anterior chamber had re-formed, but the lens was not visible, and it was presumed that it had been dislocated backwards into the vitreous chamber. After twenty-four hours the boy's condition had improved considerably, and an exploratory operation was performed under general anaesthesia.

The edges of the corneal wound were cleared and stray fragments of tissue abscissed, the iris was freed from the wound so far as possible, and a conjunctival flap was drawn over the whole of the corneal surface with a purse-string suture. No trace of the lens was seen at the operation, but the corneal wound did not appear to be large enough for it to have been extruded.

Recovery was uneventful, but when the eye became quiet about a fortnight later a broad anterior synechia was found to be present and the eye remained slightly irritable and a few

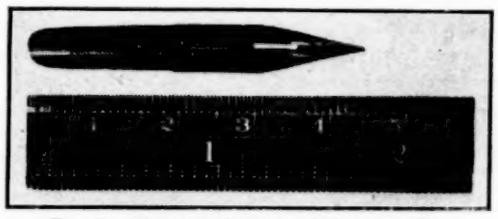

FIG. 1.—Showing the size of the pen-nib.

keratitic precipitates appeared. Again no trace of the lens could be made out with the slit-lamp or with the ophthalmoscope, although the fundus details were largely obscured. The tension remained very low, and it was thought advisable to attempt to divide the anterior synechia. On June 19, under a general anaesthetic, an attempt was made to divide the synechia with a Gibb's knife. A portion was divided, but the synechia proved to be very vascular and a large haemorrhage took place into the anterior chamber, and the operation had to be abandoned. The eye did not settle well after this operation, fresh keratitic precipitates appeared, the tension remained very low, and the visual acuity was reduced to bare perception of light with inaccurate projection. Accordingly, as it seemed clear that there was a considerable risk of sympathetic ophthalmia and no useful vision was likely to be restored to the left eye, it was enucleated on July 17, and sections were prepared from the enucleated globe.

These sections (one of which is reproduced in Fig. 2) demonstrate that the pen-nib inflicted a through-and-through perforation of the globe by transfixion, and that almost the whole of the lens was carried through the vitreous chamber and must have escaped through the posterior perforation into the orbit.

Considering the toughness of the coats of the globe and its mobility, it seems almost incredible that a comparatively blunt instrument, such as a pen-nib, should have been able to inflict a double perforating wound in this way, and the escape of the lens through the posterior wound is another unusual feature. Radiographs of the left orbit have shown no evidence of bony injury or retained foreign body. Convalescence following the enucleation of the eye was quite normal, and the boy has now been fitted with an artificial eye and has returned to school.

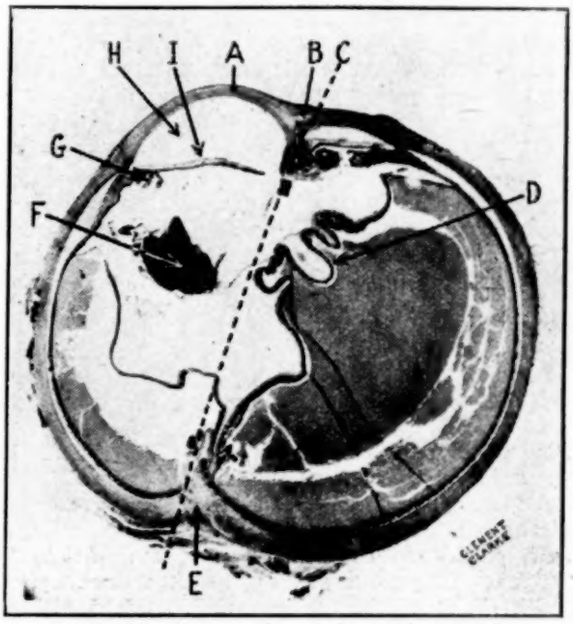

FIG. 2.—Showing a section of the enucleated globe.

A = Cornea. B = Healed anterior perforation with anterior synechia. C = Line of injury. D = Detached retina. E = Healed posterior perforating wound. F = Fragment of lens. G = Ciliary body. H = Anterior chamber. I = Iris.

I wish to express thanks to the head master of the school concerned for his generous assistance in furnishing certain details, and to Messrs. Clement Clarke for the excellent illustration prepared from microscope slides. Thanks are also due to the pathological department of Moorfields Eye Hospital for preparing the sections.

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The Earl of Granard, presiding at the annual meeting of the Royal Cancer Hospital, said that during the early part of the war the radiotherapy clinic of that hospital was the only one open in London, and patients were received for *x*-ray treatment from many of the largest hospitals in the metropolis. The proposed scheme for the extension of the hospital had had to be postponed owing to the war, but the need for further accommodation for the nursing and domestic staffs and the provision of laboratories still remained urgent. At the end of 1939 the institution was working at great pressure; this year the number of beds released for immediate use had increased to eighty, and some beds had been opened in Granard House.

Reviews

PERIPHERAL VASCULAR DISEASE

Circulatory Diseases of the Extremities. By John Homans, M.D., Clinical Professor of Surgery, Harvard Medical School. (Pp. 330. 24s. net.) New York: The Macmillan Company. 1939.

Circulatory Diseases of the Extremities, by John Homans, is a book for which we have long been waiting. It is fifteen years since Buerger's monograph appeared, and this dealt almost exclusively with one condition—namely, thrombo-angiitis obliterans—but here we have a comprehensive account of present knowledge of those disorders of the peripheral circulation which affect veins and lymphatics as well as arteries. The author's own explorations have been mainly in connexion with diseases of the veins and lymphatics, including thrombo-phlebitis and elephantiasis, and these disorders are therefore given due consideration as well as the purely arterial ischaemias and hyperaemias. Many practitioners appear to regard the term "peripheral vascular disease" as constituting a confusing medley of ill-defined clinico-pathological conditions, but with the aid of this book such confusion should disappear and it should be possible to recognize different disorders and successfully treat at least certain of them. In this connexion the opening chapter, headed "Sorting Out the Vascular Disorders of the Limbs," is important, and also Chapter IX, "Interpretation of Some Simple Observations upon the Circulatory Disorders of the Limbs." In this last chapter the significance of pain, cyanosis, pallor and coldness, swelling, and peripheral arterial pulsations are discussed. Other important chapters deal with spasm of the arteries and arterial embolism, thrombo-angiitis obliterans, varicose veins, aneurysms, pulmonary embolism, and lymphoedema, and with arteriosclerotic deficiency and thrombosis.

The book is well illustrated with a series of excellent line drawings and some photographs which for the most part are of cases from the surgical clinic at the Peter Bent Brigham Hospital in Boston. The text is clear and printed in large type on dull paper, which facilitates reading. As to style, we cannot do better than quote a few lines from the treatment of Raynaud's disease to indicate its easy and attractive character. "If she [the victim of Raynaud's disease] can be sure of avoiding exposure afterwards and does not fear the habit, she may justifiably take a stiff drink of alcohol before breakfast! Whether physicians should advise such a course is a matter which the writer is not wise enough to discuss" (p. 129). A bibliography is not included, but at the end of each chapter references are given to a number of important papers dealing with the particular aspect of the subject discussed in that chapter. This is an altogether admirable treatise which should have a wide appeal to physicians and surgeons interested in vascular disorders.

SERODIAGNOSIS OF SYPHILIS

Séro-diagnostic de la Syphilis. Études Comparatives de la Sensibilité et de la Specificité de Différentes Réactions actuellement Employées. By Th. M. Vogelsang. (Pp. 218.) Bergen: J. W. Eides. 1940.

Of recent years the diagnosis and control of syphilis by serum reactions have become so important and these reactions so varied and complicated that a volume such as this on the serodiagnosis of syphilis—comparative studies of the sensitivity and specificity of various reactions in current use—will be welcomed by serologists and syphilologists alike.

The author traces first the evolution of the Wassermann and flocculation reactions, discusses the theory of how they work and shows their mechanism; he then gives his own experience of running various tests in parallel. In order are described and evaluated various modifications of the Wassermann reaction and a number of the better-known flocculation tests, including the Kahn, Meinicke, Müller, Kline, Eagle, Rytz, and Ide. His deductions agree with the views held by the majority of serologists—namely, that (1) the flocculation reactions are more sensitive than the Wassermann, especially in treated cases of syphilis; (2) the Wassermann reaction is more reliable for diagnosis in that it tends to give fewer false positive results; (3) no test approaches 100 per cent. sensitivity; beyond a certain point the more sensitive a test is made the less specific it becomes; (4) a combination of two or more tests is desirable; the greater the number of tests the greater the number of cases of syphilis that will be discovered. Even the most sensitive reactions will occasionally be negative when a much less sensitive one is positive. The author himself favours four tests on each serum as a routine. This seems rather a counsel of perfection, and most workers are satisfied with two.

Most people will agree that a well-conducted Wassermann reaction gives the smallest number of false positives, but the author seems a little unkind to the Kahn, whose specificity he impugns, though this reaction showed itself to be absolutely specific at the various serum conferences in the hands of Kahn himself. In the case of cerebrospinal fluids there was little to choose between the Wassermann and flocculation reactions, but frequently the latter do not work well if the fluid is contaminated or cloudy. As to which are the best reactions each worker must decide for himself; a perusal of this book will give him ample material from which to extract the evidence. Numerous tables and diagrams are included, and there is a good bibliography.

VOCATIONAL GUIDANCE

Vocational and Occupational Guidance. By Reese Edwards. (Pp. 117. 2s. 6d. net.) Cambridge: W. Heffer and Sons, Ltd.

In his book on vocational and occupational guidance Mr. Reese Edwards gives an outline of the stage to which our knowledge of this rapidly expanding subject has attained. He gives very little detailed information, so his book can serve only as an introduction to a study of the subject, and indicate the need for the consultation of other and more elaborate literature. The author distinguishes between vocational guidance and occupational guidance, restricting the former term to guidance for specific vocations, and not covering all and every type of guidance. He considers that any type of vocational guidance presupposes the existence of a scheme of vocational training, as the two procedures are closely connected, and he maintains that psychological advice ought to be available for all before any special vocational training is undertaken. A system of guidance would prove particularly helpful as an aid to solving the problem of juvenile employment, and it is easiest to apply when trade is good and the demand is greater than the supply. Such a condition is probable in the near future, owing to the falling numbers of juveniles available for employment. In most branches of industry, however, it is more usual for the labour supply to be greater than the demand, and methods

of vocational selection ought then to be followed. It must be realized that vocational guidance cannot entirely eliminate competition between individuals. Some will prosper and others will fail, but guidance leads to a higher level of all-round efficiency and to fewer misfits.

FRENCH SYSTEM OF OPHTHALMOLOGY

Traité d'Ophtalmologie. By P. Bailliart, Ch. Coutela, E. Redslob, and E. Velter. Volumes III, IV, and V. (Pp. 1,148 Vol. III; pp. 891 Vol. IV; pp. 853 Vol. V; illustrated.) Paris: Masson et Cie. 1939.

The scope of the *Traité d'ophtalmologie* published under the auspices of the French Ophthalmological Society was indicated in our review of the first two volumes (November 11, 1939). Vols. III, IV, and V have now come out. The first of these covers a wide range of subjects; the others are devoted to purely clinical studies. Of the twenty-three articles in Vol. III four are devoted to various laboratory procedures, and of the contributions on binocular vision and on anomalies of refraction, light sense and colour sense, the articles on myopia by J. Mawas, and on colour defect by A. Polack, deal ably and succinctly with a diffuse and contradictory literature. Perhaps the most notable contributions in this volume are the extensive articles on ocular pathology by Redslob and Géry, and the briefer survey on endocrinology by Franceschetti and Gorin. The short articles on ocular allergy by A. Koutseff and on vitamins by N. Bezssonoff are models of compression and lucidity. The volume concludes with a discussion of the affections of the lids, while Vol. IV opens with a contribution of 300 pages in which Dr. V. Valière-Vialeix deals exhaustively with the lacrimal apparatus. This section is particularly strong on its pathological side, and the illustrations are well chosen. The pages devoted to the Mikulicz syndrome contain an up-to-date and well-balanced review of this difficult subject, due attention being paid to the recent work on uveo-parotitis. The subject-matter of this section is indeed excellent, and we therefore regret all the more that the style is rather discursive. A general account of conjunctival affections by Renard and Nataf and the section on trachoma by Cuénod and Nataf are particularly valuable because of the stress laid on slit-lamp findings. By themselves these two chapters constitute a most useful modern monograph. The pages devoted to folliculosis simplify diffuse teaching, while the text on swimming-bath conjunctivitis should do much to standardize teaching on a subject admittedly vague. L. Genet in an exhaustive section deals with conjunctival lesions secondary to general disturbances, and P. Mérigot de Treigny contributes a chapter on tumours of the conjunctiva. Corneal lesions are handled fully by P. Prélat, whose classification of the hereditary lesion, though helpful, is not as exhaustive as that of Bücklers, whose recent monograph must be regarded as the most definitive study published so far. Vol. IV closes with a chapter on some special corneal affections by G. Kleefeld, and a chapter on the sclerotic by P. J. Petit.

Vol. V is devoted for the most part to the diseases of the retina, dealt with mainly by Dr. P. Bailliart. As a descriptive contribution his article leaves little to be desired. This chapter is even more profusely illustrated than the rest of the book and there is little of modern work that has been overlooked. One regrets, however, that more attention is not given to physiological aspects of retinal disease—an approach to which the author has contributed so substantially. The difficulties of breaking away from an anatomical approach are, of course, real, but such contributions as Bailliart's on the subject of capillaritis emphasize the present unsatisfactory state, in which the approach is neither anatomical nor physiological. The lack of any reference to heparin treatment of thrombosis of the central vein is a minor defect. The sections on the iris and choroid are contributed by M. Teulières and J. Beauvieux. Here too the matter is as modern as one could wish, and the section on tuberculosis of the uveal tract is particularly noteworthy. A full review of recurrent retinal haemorrhages is contributed by P. Jeandelize and P. L. Drouet, who emphasize the endocrine factor. M. Amsler and Madame S. Schiff-Wertheimer deal fully with the aetiology and clinical features of retinal detachment, while J. Mawas contributes a short but illuminating chapter on tumours of the retina. A more standardized account of lesions of the optic disk is given by J. Bollack and S. Delthil. Their discussion on excavations of the disk is particularly helpful. The volume closes with a chapter on affections of the lens by C. Duverger and E. Velter. This section is as modern as the chapters on the conjunctiva, the whole subject being dealt with in the light of slit-lamp findings.

SEXUAL ABNORMALITIES

The Sexual Perversions and Abnormalities. By Clifford Allen, M.D., M.R.C.P., D.P.M. (Pp. 194. 7s. 6d. net.) London: Humphrey Milford. 1940.

To some readers this will appear an unsavoury subject, but it is one of which members of the medical profession must take notice and towards which they must try to adopt a more intelligent and scientific attitude than many do at present. Dr. Allen's book will certainly be of assistance and we welcome it sincerely, though regretting that more careful proof-reading had not removed errors of grammar and style, as in the last paragraph of the preface. The author has drawn from his own experience, and if he is now and then dogmatic on matters which must still be *sub judice* a short book is none the worse for that. Much time and labour will have to be spent on this subject before it can reach any finality, for we are still in the midst of the battle between the endocrinologists and the psychiatrists who dispute this terrain. None the less, while the endocrinologists will always retain a section of the field, the psychiatrists are advancing steadily on a wide front.

Consideration of the nature of the sexual instinct and its reflex mechanisms leads on to an interesting discussion of its development and manifestation in the apes and primates. The varieties of perversions and under-development and over-development of the instinct in man are described, and this subject is illustrated by accounts of typical cases from the author's own practice. In treatment he favours a modification of analytic therapy, and notes that it is very difficult to tell how easy it is going to be to treat a patient until you try. Not all cases of impotence are easy to treat (*pace* one distinguished authority), though some yield very quickly to simple psychotherapy. The book closes with a discussion of the medico-legal implications of sexual abnormalities.

Notes on Books

The first volume of the third series of the *New International Clinics* edited by Dr. GEORGE M. PIERSOL (Philadelphia, Montreal, New York, and London, J. B. Lippincott Company; 60s. net per set of 4 vols.) is divided into three unequal parts devoted respectively to original contributions, clinics by members of the staff of the Hospital of the University of Pennsylvania, Philadelphia, and a review of recent progress in vitamins. Among the original contributions attention may

be drawn to those on kidney diseases of mid-life, foetal risk in breech delivery, jaundice, nail cracks, diabetes, and pharmacologic shock therapy. The following clinics are of remarkable interest: acute regional enteritis, the role of the radiologist in the diagnosis of obscure and chronic obstructive lesions of the small intestine, a clinical analysis of pruritus ani, the relation of gastritis to the anaemias, extra heart sounds and frictions, and treatment of prothrombin deficiencies with vitamin K.

An official *Directory of Medical Specialists Certified by American Boards* has been prepared under the editorship of Dr. Paul Titus. It is a large and good-looking volume of nearly 1,600 pages, published in New York by the Columbia University Press at $5 and in London by the Oxford University Press at 33s. 6d. The work includes the names, addresses, and other biographical data concerning 14,000 specialists. Separate sections are devoted to the special boards (fourteen in number), giving lists of officers, principles of organization, requirements for the examinations, etc., also brief biographical details concerning those who hold their diplomas. The final section contains an alphabetical list of all those holding special diplomas, with the professional address of each person and the name of the special board which granted the certificate. It is planned to issue revised editions of this directory every two years.

For its fourteenth year the French therapeutic annual—*L'Année Thérapeutique : Médications et Procédés Nouveaux*—has appeared promptly as usual, and in its three parts—new treatment, new methods, and new drugs—Dr. A. RAVINA summarizes judiciously the advances of the past year. The publishers are Masson et Cie and the price is $0.70.

Preparations and Appliances

APPLIANCE FOR TREATMENT OF DIFFICULT FRACTURES OF THE MANDIBLE

Flying Officer ALEXANDER B. MACGREGOR, M.A., M.B., B.Ch., L.D.S., R.A.F.V.R.(Med.), formerly assistant dental surgeon to St. Bartholomew's Hospital, etc., writes:

In cases of fracture of the mandible in the region of the angle, where the line of fracture runs obliquely downwards and backwards, the posterior fragment usually becomes tilted forwards and upwards due to the pull of the temporal and masseter muscles. Although the posterior fragment may be reduced into its proper position, it usually slips back again; and, where no tooth is present on the posterior fragment to which a splint can be applied, the problem of retention of the posterior fragment becomes a very real one. Internal plates with flanges designed to push the posterior fragment downwards and backwards often cause severe ulceration and sloughing of the gum tissue over the bone, and are generally unsatisfactory.

A far more accurate method, having in addition the advantage of being more comfortable to the patient, consists in the application of direct traction to the posterior fragment by means of a wire inserted through a hole drilled in the bone. This method has been suggested and described before, but so far as I know has not been at all extensively employed. An apparatus has been designed for this purpose, so that a backward pull in any direction may be applied to the posterior fragment. The apparatus is shown in the photograph (Fig. 1) and in the diagram (Fig. 2).

It will be seen from the diagram that the head-plate (1) can be fixed in plaster, or where a scalp wound is also present fixed by means of straps attached to the lugs (2). Complete fixation with plaster is clearly the method of choice where possible. The descending arm from the head-plate can be rotated in any direction at 3, and also moved in and out from the head-plate to adjust for the varying shape of head or thickness of neck. The descending arm has a sliding extension (4) carrying a swivelling arm (5). The wire inserted through a hole in the posterior fragment of the mandible is brought out through the incision, and attached to the eye on the end of the swivelling arm. Tension on the wire, and hence on the posterior fragment of the mandible, is applied by rotating the collar (6).

The appliance is shown in position in the photograph, and can be used for either side of the mandible by rotating the swivelling arm (5) about its axis. It does not appear to cause much discomfort to the patient, and with its aid the posterior fragment can be restored accurately and maintained in its correct position.

FIG. 1

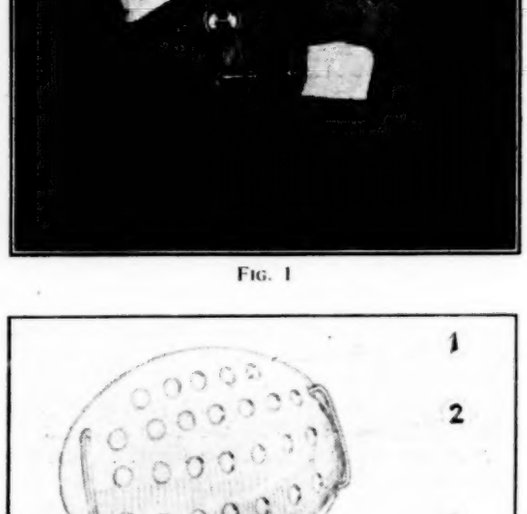

FIG. 2

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TREATMENT OF WAR WOUNDS

It was announced last week that a committee has been appointed by the Medical Research Council to "advise on the application of the results of research to practice in the treatment of war wounds, and on the need for new investigations." In spite of our having been at war for nearly a year there has been little opportunity yet to study the effects on military surgery of the therapeutic advances of the past twenty years. Apart from improvements in surgical technique these advances include the introduction of active immunization against tetanus, the production of certain antitoxic sera of much increased potency, and the employment of sulphonamide compounds in combating infection. The last of these new factors is immeasurably the greatest, but it must not lightly be assumed that its potentialities in the treatment of war wounds can be deduced from existing information, whether experimental or clinical. The condition which more than any other determines the result of this form of treatment is the species of micro-organism to be attacked, and thus far it is legitimate to expect good results, as we know that the majority of bacteria commonly causing wound infections are susceptible to the action of sulphonamide compounds. But the site and nature of the lesion are not without their influence, and it should be remembered that the most reliable data on the results of sulphonamide treatment refer to specific conditions such as erysipelas and puerperal fever; it is by no means easy to ascertain its effect in the more miscellaneous field of accidental wounds involving a variety of structures.

Even granting that the whole outlook in treating wound infections has been radically changed, as it probably has, it remains to be decided how best to apply chemotherapy for this purpose. The first choice to be made is for or against universal chemoprophylaxis. Should every casualty be given moderate doses of sulphanilamide forthwith and for a specified period in order to check bacterial growth in his wound from the outset? There is very little information about the value of this method; it has been tried extensively only for the prevention of puerperal fever, with inconclusive results. Although the possible advantages are clear, there is also at least a theoretical danger of selectively breeding out from the original wound flora those bacteria, whether individuals or species, which are most resistant to sulphonamides. Infections so arising would be resistant to treatment, whereas if the drug were withheld until signs of infection appeared the nature of the infection would be determined by other and natural factors and the bacteria concerned might often be fully susceptible. Another important choice is between systemic and local application. The fact that sulphanilamide given by the mouth exerts its antibacterial effect throughout the body has naturally discouraged the idea of its local application; to have an effective concentration uniformly distributed throughout the lesion, however deep and widespread, by the agency of the blood stream is better calculated to succeed than mere application to a surface. There have nevertheless been occasional reports for some years past of the successful local use of prontosil or sulphanilamide in superficial infections, and the idea of introducing solid sulphanilamide in considerable amount into recent wounds as a local antiseptic was mooted before the war and tried in a few cases with apparent success. The results of applying this treatment to gunshot wounds in France have not yet been made known, although Levaditi and his colleagues[1] report favourably on the local treatment with rubiazol or sulphanilamide of wounds in which infection was already established. If we were to hazard a guess at the ultimate answers to these two important questions it would be that prophylaxis should be local and treatment systemic. The third problem is the choice of compound. This lies mainly between three—sulphanilamide, sulphapyridine, and sulphathiazole—and although efficacy for a particular purpose should be the principal guiding consideration, price and availability may also have to be taken into account.

Much of the uncertainty about the best way of treating war wounds is centred on gas gangrene. There have been several enthusiastic pronouncements on the chemotherapy of this condition, but it is so comparatively rare in ordinary practice that war provides the only opportunity for studying its treatment on an adequate scale. Apart from a few clinical reports based on small numbers of cases, our only information on this subject is experimental. Here the recently published results of D. W. Henderson and P. A. Gorer[2] may usefully be compared with those of Dora Stephenson and Helen E. Ross which appeared earlier in this *Journal* (March 23, p. 471). They are in substantial agreement, but differ in some particulars which are partly at least referable to differences in technique. Stephenson and Ross found sulphanilamide as effective as sulphapyridine in treating the form of *Cl. welchii* infection produced by intraperitoneal injection in mice. This equality of effect emerges nowhere from Henderson and Gorer's results, but they used a different route of inoculation. There is full agreement on the superiority of sulphapyridine over sulphanilamide for treating infections by *Cl. septique*, and on the poorer results of treatment when inoculation is

[1] *Bull. Acad. Méd.*, Paris, 1940, **123**, 39.
[2] *J. Hyg.*, 1940, **40**, 345.

intramuscular instead of intraperitoneal or intradermal. Additional points in Stephenson and Ross's results were the total insusceptibility of *Cl. oedematiens* to either drug, and a distinction in therapeutic effect depending on the relative degrees of toxigenicity and invasiveness in *Cl. welchii*. There is also agreement in the observation that combined drug and serum treatment is more effective than either alone. This aspect of the subject has been studied in greater detail by Henderson and Gorer, and an interesting feature of their work is a comparison of the effect of sulphapyridine, antitoxic serum, anti-bacterial serum, and combinations of these on infection by *Cl. septique* in mice. Under the conditions of this experiment each of these three reagents used alone saved only about 7 per cent. of the animals; the two sera together raised the survival rate to 15.5 per cent., but with sulphapyridine plus anti-bacterial serum it was 72.2 per cent., and with sulphapyridine plus antitoxin 88.7 per cent. There is therefore clear evidence of synergic action, and anyone faced with a clear case of rapidly extending gas gangrene will doubtless feel it his duty to treat it by the combined method. Among the more debatable questions which still remain is whether gas-gangrene antitoxin should be used for prophylaxis, and if so to what extent. A uniform policy in this matter would facilitate further study, and in view of the obviously greater efficacy of present-day treatment there is much to be said in favour of reserving antitoxin for therapeutic use.

SOCIAL ASPECTS OF ALCOHOL

The taking of alcoholic drinks is a social habit that has an important influence on the public health, and accurate information regarding this problem should be available to the medical profession. Information is of course abundant, but most of it appears in the form of propaganda. The book entitled *Alcohol and the Nation*, by Dr. George B. Wilson,[1] is of special interest because, as Lord Stamp points out in a foreword, the author has great experience and knowledge of the subject and has compiled an encyclopaedia of facts for which he provides interpretations based on an informed judgment. The volume covers the period 1800–1935 and deals only with Great Britain. The British drink consumption is carefully analysed, and it appears that during the nineteenth century no very definite change occurred in the amount consumed per caput per annum. Thus the intake of beer remained constant at about 30 gallons and of spirits at about one gallon of proof spirit, while wine fluctuated between a quarter and half a gallon. From 1904 onwards there was a large and steady decline in these quantities: spirits dropped to 0.22 proof gallon and beer to 13 gallons. The additional taxation on spirits and beer in the War Budgets of 1939 and 1940 will no doubt accelerate this decline. The figure that has remained most constant is the average yearly expenditure on liquor of each adult member of the population, which was £7 12s. in 1901 and £8 2s. in 1931. The author calculates that if teetotallers and occasional drinkers are excluded the remaining adults spend on an average about £15 per caput per annum. Lord Stamp reckons that expenditure on alcohol absorbs some 7 to 8 per cent. of the national income. Of this money more than two-fifths is taken by the revenue authorities. It is of interest to note that in the period just before the present war the expenditure on alcoholic drinks was £259 million a year, the expenditure on tobacco was estimated to be £154 million, and the turnover on gambling £500 million.

A feature of Dr. George Wilson's study is his analysis of the finance of "the Trade." The brewing trade provides one of the most conspicuous examples of effective rationalization of an industry. In 1835 there were 45,000 breweries; by 1935 the number had been reduced to 1,100. These figures do not fully reflect the centralization that has occurred, and the author estimates that to-day sixty breweries provide 70 per cent. of the beer drunk in Britain. Furthermore, about 95 per cent. of licensed premises have become tied houses. The capital also is under the control of a limited number of persons, for an analysis made by the author in 1927 of 365 breweries and forty-two distilleries showed a total capital of £222 million, of which more than a quarter was held by 1,600 persons or joint interests. The success of this centralization is best indicated by the fact that in 1913 the breweries made a profit of £10 million and brewed 28 million standard barrels of beer, whereas in 1935 the profit was £31.5 million on an output of 13 million barrels. Moreover, the specific gravity of the beer dropped concurrently about 20 per cent. Figures showing the sums spent in advertisement and propaganda by the liquor trade do not appear to be available, but such information as is disclosed suggests that brewing is an outstanding example of how profits can be maintained by an industry, in spite of a falling turnover, by means of centralization and skilful publicity. Various declarations by the trade have been made in recent years which betray uneasiness at the temperate habits of the rising generation. One striking pronouncement on these lines ended with the remark: "We want to get the beer-drinking habit instilled into thousands, almost millions, of young men who do not at present know the taste of beer." As a set-off to this we should perhaps note the wartime gift of the British brewing industry to the Ministry of Information of the whole of the advertising space booked by the Brewers' Society in the national and provincial newspapers for the next few months.

As regards the influence of alcohol on the health of the nation the figures quoted are satisfactory. The deaths from alcoholism and cirrhosis of the liver rose steadily from about 50 per million in 1860 to a peak of 257 per million in 1900, but since then the rate has dropped steadily and is now about 40 per million. Moreover, proceedings for drunkenness have shown a fall similar in amplitude. Taken as a whole, Dr. Wilson's findings provide a remarkable variety of facts relating to the consumption and sale of alcoholic drinks.

[1] *Alcohol and the Nation*. By George B. Wilson, Ph.D., B.A. (A Contribution to the Study of the Liquor Problem in the United Kingdom from 1800 to 1935.) London: Nicholson and Watson. (63s.)

HOURS OF WORK IN MUNITION FACTORIES

A leading article in the *Journal* of April 13 (p. 620) reviewed the Emergency Report No. 1 of the Industrial Health Research Board,[1] which devotes a special chapter to fatigue, pointing out once again that an extension of the usual hours of work does not—except for short periods during an emergency—result in a proportional increase in output, and that rest pauses are a necessity to health, contentment, and efficiency. The authoritative article by Dr. H. M. Vernon published to-day at page 25 makes this principle its starting-point. The need of the moment is not so much for new research on hours of work and output as for the application of knowledge already gained, largely through the investigations of the Health of Munition Workers Committee appointed in 1915. The true sign of fatigue is diminished capacity. We are glad to know that Mr. Ernest Bevin, Minister of Labour and National Service, hopes soon to make suggestions to industry for so arranging the hours of work that industrial fatigue can be reduced to a minimum, and that he is particularly concerned about women and young persons. Such suggestions, Dr. Vernon insists, ought to take the form of compulsory orders, and he has some ominous facts to record about the harm done to women munition workers by excessive hours of toil. For men, as for women, a weekly day off is indispensable; by a system of relays the industrial plant could be kept running continuously to meet our urgent need for war supplies. The points made by Dr. Vernon are reinforced by a correspondent writing in the *Times* of July 2, who says that, except for a comparatively short "drive" or "push," maximum production and efficiency in production are never attained by overtime, if the normal working hours are already, in most occupations, eight or nine a day. "Our experts know all about this, but they are sometimes overborne by hysterical demands from politicians and others. Speeding up is often necessary; but speeding up and long hours are not the same and are often incompatible. The application of intelligence to the manifold problems of speeding up is of the utmost importance; but mere increase of working time almost always defeats its own object." These are not new ideas or principles; they are the fruit of expert study and experience. It has long been known that efforts to stimulate workers to feverish activity in the supposed interests of output are useless, and, indeed, mischievous. A seven-day industrial working week is bad economy and therefore indefensible.

[1] *Industrial Health in War.* H.M. Stationery Office. (6d.)

REACTIONS AFTER TRANSFUSIONS WITH STORED BLOOD

In their study of the reaction rate following the use of stored blood published in our present issue DeGowin and Hardin have analysed 1,458 cases given blood stored from one to thirty days and 146 cases given fresh blood. Unfortunately they add their blood to more than half its own volume of diluent, which makes close comparison of their results with those obtained with the less dilute blood employed here unsatisfactory. No type of reaction was found to occur, particularly with stored blood, and there appeared no greater incidence of reaction with stored than with fresh blood. Examination of their tabulated results shows, however, that though some few patients were given blood after thirty days' storage the greater part of the blood on which their figures are based was only three to seven days old. In other words, their conclusions apply to blood that is not more than one week old. Urticaria or angioneurotic oedema was noted as a reaction in 1.4 per cent. of 1,604 transfusions. In spite of careful histories taken from both donors and recipients the authors were unable to correlate these reactions with previous allergic symptoms except in one instance. A man, two years previous to giving blood, had had a severe and unexplained attack of angioneurotic oedema. Four of ten people to whom his blood was given developed such severe angioneurotic oedema that the transfusions had to be stopped. The authors conclude that at least a proportion of the reactions that occur are due to something in the blood and not to the presence of pyrogens in the apparatus or diluting fluid used; when the rate of febrile reactions after the parenteral injection of saline or glucose saline prepared in the same laboratory was compared with that after blood transfusions there was approximately a 3 per cent. higher rate in the case of the latter. It is suggested that this may be due to some peculiarity in the blood itself, or the introduction at the time of collection of the blood of organisms which live for a few hours, produce pyrogens, and are then killed by the normal bactericidal agents in the blood. On the other hand, the authors do not appear to have considered the possible effect of temperature, and they claim that stored blood may be given cold without ill effects, but at the same time it is possible that cold blood may have some action on the recipient that is not shared by cold saline. Further, it is likely that saline and glucose solutions were not kept in refrigerators before administration, and therefore reached the patient at room temperature. The authors expressly state that the blood was not warmed. The results, therefore, of a comparison between the administration of blood and saline in their series do not seem satisfactory. Stored blood is likely to be used in considerable quantities in this country in the near future. The practical conclusion that can be drawn from this most recent American study is that stored blood can be employed with every confidence that it will not cause severe or unusually frequent reactions.

DIET IN THE HIGHLANDS AND ISLANDS OF SCOTLAND

The valuable work which Professor E. P. Cathcart and his co-workers have carried out in dietary surveys of certain parts of Great Britain is well known, and to the reports on actual conditions in St. Andrews, in Cardiff, and in Reading is now added a study made in the Highlands and Islands of Scotland.[1] The method used was, as before, to select a number of families and ascertain the food intake of each during a period of one week. This was done for fifty-eight families in the Highlands during one week in summer and was repeated for forty-four of these for a week in the winter. In addition, the diets of twenty-three families in the Island of Lewis, Outer Hebrides, were also studied in summer. The results are of great interest. In the first place, they show that, contrary to a popular and dismal belief that tinned food and shop-bought articles have replaced the old staple diets of natural foodstuffs, "the amounts of protein, fat, and carbohydrate consumed by the Highland population . . . are definitely superior to those found in the St. Andrews study. The proportion

[1] *Studies in Nutrition: An Inquiry into the Diet of Families in the Highlands and Islands of Scotland.* By E. P. Cathcart, M.D., D.Sc., A. M. T. Murray, and J. B. Beveridge. Medical Research Council Special Report Series No. 242. H.M. Stationery Office. 1940. (9d. net.)

of protein present in 'first-class' form is only 2 per cent. lower than in St. Andrews, but is definitely above that found in Cardiff and Reading." Studying the diets in more detail, the authors of this report dispose of one important point in the statement that "the intakes of mineral substances and of vitamins would appear to be sufficient." Unfortunately the consumption of fish by Highland families is low, even in summer, as also is that of leafy vegetables, although the consumption of root vegetables other than potatoes is high. Leafy vegetables were scarce in the diets investigated in the Island of Lewis, but in other respects the diets there are better than those of the mainland. The intake of protein, the percentage of "first-class" protein, and the intake of fat were all higher, and "the mineral and vitamin content of the Lewis diets seems to be adequate." There were other differences in the mainland and island dietaries. In Lewis more mutton than beef is eaten; all the families investigated eat fresh fish, and the consumption of cheese and oatmeal is higher than on the mainland. Thus in general it is reported that the intakes of protein, fat, carbohydrate, total calories, minerals, and vitamins in the districts surveyed may be regarded as fully adequate. There were pronounced seasonal variations in individual dietaries, but the mean values of the summer and winter intakes of the total populations were found to be in fair agreement. These satisfactory results can in all probability be explained by the statement that "both in Lewis and in the Highlands generally the standard of maternal efficiency is remarkably high." Thus good housekeeping is able to keep up the dietetic standard despite the visits of the travelling vans. A separate report to the Medical Research Council, on dental disease and diet of children in the Island of Lewis, was noticed in our last issue at page 1063.

ANDROGENS AND CANCER

Oestrogenic hormones, beyond a doubt, play an essential role in the induction of mammary cancer in mice. This being demonstrated, it is of evident importance to inquire if the action of the oestrogens can be annulled by the administration of androgens. Nathanson and Andervont[1] and Lacassagne and Raynaud[2] have shown that androgens exert an antagonistic action. Administration of testosterone propionate greatly reduces the incidence of mammary cancer in mice which are prone to the disease. Lacassagne[3] concludes that testosterone prevents mammary cancer by causing an inhibition of pituitary secretion and, secondarily, a suppression of ovarian secretion. The mice receiving testosterone are comparable, therefore, with ovariectomized mice, in which, as L. Loeb found many years ago, the incidence of mammary cancer is low. These experiments are concerned with the initiation of mammary cancer. Testosterone does not stop the progress of a mammary cancer which is in being when the hormone is first administered; it has a prophylactic but no therapeutic effect in mice. There is evidence that growth of transplantable benign fibro-adenoma of the breast in rats is controlled to some extent by hormones, and that these also have some effect on fibro-adenoma of the breast in women. The aggravation of cancer of the breast during pregnancy and lactation suggests that the growth of breast cancer in women can be influenced by hormones. Ovariectomy was at one time a vaunted treatment for breast cancer and still has its adherents, but it is undoubtedly safer to remove the tumour and leave the ovaries than to remove the ovaries and leave the tumour. In some patients ovariectomy is beneficial, but is in no way a cure. No greater success can be expected to result from suppressing ovarian function by the administration of testosterone to patients who already suffer from mammary cancer. If androgens retard the growth of tumours it is to be expected that their action will be exerted most conspicuously and perhaps exclusively on tumours of the reproductive organs. The failure of testosterone to influence the growth of mammary cancer in mice does not encourage the expectation that tumours of other types will respond to similar treatment. Murlin and others[4] have described an adverse effect of androgens on the growth and metastasis of the Brown-Pearce rabbit tumour, which originated as an epithelioma of the skin of the scrotum. The results are not impressive. By using a transplantable tumour, and, moreover, one which often disappears without interference, Murlin and his colleagues have complicated the issue. A transplanted tumour is alien to its host and is exposed to hostile reactions which are not exerted against spontaneous tumours. Many animals have rid themselves of transplantable tumours without aid or with the help of treatments which fail to impede the course of human cancer for a day.

[1] *Proc. Soc. exp. Biol.*, N.Y., 1939, **40**, 421.
[2] *C. r. Soc. Biol.*, Paris, 1939, **131**, 586.
[3] *Bull. Cancer*, 1939, **28**, 951.

ABSORPTIVITY OF THE SKIN

Although the primary function of the skin is undoubtedly to keep things out and not to let them in, it has been known since the beginning of the nineteenth century that various substances can be absorbed percutaneously, and attempts have been made from time to time to introduce drugs into the system through the skin. At one time the inunction of mercurial ointment for syphilis was much in vogue. The rate at which drugs are taken up by the skin varies according to the vehicle in which they are dissolved. Water is the least satisfactory solvent, but it appears that drugs dissolved in alcohol, ether, and benzene penetrate much more easily than those dissolved in oil. Recently Eller and Wolff[5] have attempted by experiments on rabbits to measure the relative penetrating power of different fats into the skin. Although the human skin differs much from that of every other kind of mammal, particularly in the fact that it is almost hairless and consequently the hair follicles are relatively few and far between except on the scalp, the results of these experiments are interesting. The authors tested three groups of fats—animal, vegetable, and mineral—the kinds chosen being cod-liver oil and hydrous wool fat (animal), olive oil and coco butter (vegetable), and liquid petrolatum and petrolatum (mineral). The fats were applied by spray to areas on the backs of rabbits which had been clipped as short as possible (shaving was not employed in order to avoid trauma). Later, at intervals of two, four, and six hours, specimens were removed and stained with Sudan IV, sections were cut and examined microscopically, and the results were checked against control areas which had not been treated with fats. Penetration was estimated by the amount of fat seen along the hair follicles and within the sebaceous glands. Eller and Wolff confirm the observations of previous workers that fats permeate the skin largely along the hair shafts and into the sebaceous glands. They found in addition that liquid fats permeate the skin more

[4] *Arch. Pathol.*, 1939, **28**, 777.
[5] *Arch. Derm. Syph.*, Chicago, 1939, **40**, 900.

rapidly than solid fats, and, as might perhaps be expected, animal fats penetrate the deepest with vegetable fats next, and mineral fats penetrating the least. In most cases the greatest penetration takes place between four and six hours after application; subsequently the quantity of fat in the deeper tissues appears to diminish, no doubt because by that time absorption is beginning to take place.

THE DRUG TRAFFIC IN EGYPT

The latest report of Sir Thomas Russell Pasha on the work of the Central Narcotics Bureau[1] fully justifies the warning he gave to the Egyptian Government in 1937 of the perils that await any relaxation of the national and international control of the traffic in dangerous drugs. The war in Europe has already increased the demand for, and loosened the supervision of, narcotic drugs, with the result that illicit traffickers are "gleefully looking forward to profits on a far vaster scale." Many of them, having served terms of imprisonment, are on release resuming their pernicious trade. From the Alexandrian branch it is reported that "the bulk of opium and hashish seized came from Syria," smuggled by crews of steamers plying between the coasts. "Drugs are dumped overboard at a preselected spot, where they are picked up by sailing boats lying in wait for them and then landed in a deserted spot." In the Lebanon, in defiance of regulations, large areas of hashish cultivation were discovered and destroyed. Among the landlords of these areas were a Cabinet Minister, two former Ministers, five relatives of a Minister, several notables and deputies, and three priests. A Syrian periodical, quoted by Sir Thomas Russell, seeks to justify this illegality, holding that "breaking the regulations of the League of Nations does not constitute a crime when one considers the numerous infringements by the most civilized European countries of the basic laws of the League." Nevertheless the French *Sûreté* authorities destroyed a crop of 1,633 tons of cannabis, the price of which per kilo was £E5 in Syria and £E40 in Cairo. It must be remembered that as Syria consumes little or no hashish the destination of this huge crop could only be Egypt. Sir Thomas Russell refers to the camel's stomach, with its large water capacity, as the medium employed for smuggling drugs across the Sinai Peninsula to the Nile Valley. The total weight of drugs recovered in zinc cylinders from the stomachs of eighteen camels thus loaded was more than seventeen kilos of hashish and sixty-two kilos of opium. The risks run by the efficient officers of the Narcotics Bureau are illustrated by the fate of one of the Labban police district. He was engaged in searching the premises of a well-known drug trafficker of Alexandria. In attempting his arrest the officer was fatally stabbed by the trafficker, who was tried, convicted, and hanged.

[1] Annual Report for 1939 of the Central Narcotics Intelligence Bureau. Cairo: Government Press, Bulâq.

REGIONAL ENTERITIS

Many features make Crohn's disease—or regional enteritis—of special interest, not the least of which is its aetiological obscurity. Running a chronic or subacute course, it is liable to exacerbations and bouts of pyrexia, with, in some cases, the formation of abscesses, sinuses, and fistulae. Like tuberculosis it is a granulomatous condition, but unlike tuberculosis it has no tendency to dissemination or distant spread. In many cases it is in fact limited to the lower few inches of the ileum, but in others it occurs high up in the small intestine, and in a few in the colon. The intestine affected—usually the ileum—is thickened and rigid, the walls are swollen, and the lumen is narrowed; stenosis and obstruction, or local perforation with fistula formation, may follow. A firm and tender mass is usually to be felt in the right iliac fossa. Regional ileitis is an uncommon disease, but more cases are now being recognized. It is often at first mistaken for appendicitis, and in some instances it remains undiagnosed even at operation. As a rule there is diarrhoea, and bouts of colic may accompany or alternate with periods of general abdominal discomfort, flatulence, distension, and some constitutional upset. Casten[1] has stressed general constitutional disturbances in an account of a patient with regional enteritis involving all but six feet of the small intestine. In this patient there were indications of serious vitamin deficiency, and in particular of vitamin C. Further, the continued severe diarrhoea so frequently present in Crohn's disease is apt to lead to loss of fluid and body protein, a state of affairs not improved by the restricted diet. In Casten's patient post-operative healing was almost non-existent in spite of the absence of infection, a fact which he attributed to the prolonged loss of protein before operation. Such cases emphasize the need for adequate quantities of protein and vitamins in the diet of patients with regional enteritis or other long-standing intestinal diseases. Histological examination of the affected bowel showed oedema, diffuse fibrosis, great hypertrophy of the muscularis mucosae, and chronic inflammation of the mucosa. The causative organisms and other factors concerned in the production of this localized inflammation are unknown. *B. tuberculosis* is not the infecting organism. Stool cultures in Hurst's cases[2] were inconclusive, except in one case of regional colitis, in which pure cultures of *Bacillus asiaticus* were obtained. Scheifley[3] has reported the disease in a brother and two sisters, and Crohn also records an instance in which two sisters were affected with it; it is, however, rare that any familial tendency is noticed. Treatment is surgical, and in many cases gives lasting relief. When possible, excision of the thickened inflamed portion of intestine is to be preferred to any short-circuit operation, but when abscess, dense adhesions, or fistulae have formed excision may be quite impossible. Simple drainage with, if possible, an entero-anastomosis around the inflamed mass may give remarkably good results, but medical measures are usually ineffective.

[1] *Surgery*, 1939, **6**, 708.
[2] *Guy's Hosp. Rep.*, 1939, **89**, 54.
[3] *Proc. Mayo Clin.*, 1939, **14**, 479.

DOMINION HOSPITALITY FOR DOCTORS' CHILDREN

The British Medical Association has received through the Federal Council of the British Medical Association in Australia and the Canadian Medical Association offers from doctors in those countries to take into their homes British children whose parents wish them to be away from the war zone. We are grateful to them for their generosity so freely offered and so swiftly expressed. The Association is in touch with these Dominions, and it is hoped that a limited scheme of transfer may be arranged. In the meantime doctors are asked *not to communicate with B.M.A. House on this subject until a further announcement has been made.*

THE NATION'S LARDER IN WARTIME

*This is an abridged version of one of a series of lectures recently delivered before the Royal Institution**

THE FUNCTION OF THE FOOD INDUSTRY

BY

L. H. LAMPITT, D.Sc., F.I.C.

Member, Food Investigation Board

In every part of the world the food factory is replacing the domestic kitchen. It is not for me to discuss those changes in the economies of the urban dweller, those influences on the women of to-day, which are responsible. The replacement is deplored by some and stimulated by others, but it is an incontrovertible fact. Another incontrovertible fact is that communal feeding is the most economic method of feeding. To cater for a dozen costs less for each person than to cater for each one of a dozen individuals; to cater for a million is to save the nation's wealth.

The food industry occupies an intermediate position between ordinary household catering as known generally a hundred years ago and mass catering of the canteen type. My task is to try to indicate the function of the food industry in times of stress, and therefore to get a clear idea of the industry as a whole.

First let me mention that I have found evidence of muddled thinking in respect of "prices." Thus land is tilled and fertilized, a crop sown and tended, energy absorbed by the growing plant from the sun, something taken from the soil, and the crop garnered. All these factors could be similarly expressed in units of energy together with certain units of vitamins and other important nutritional elements. Our problem to-day is to see that the maximum use is made of this total energy. We are not concerned here with the difference between the prime cost of producing the crop and the price at which it is sold to the customer; we are not concerned with the purely artificial proportion of this price difference between the producer, the intermediate dealer, and the retailer. To indicate the most equitable division, in wartime at any rate, is a function of government—a function which, in fixing prices of raw materials and of certain finished goods, the Government has partly assumed.

The functions of the food industry fall into three groups: the preparation for distribution of primary articles such as milk and milk products, butcher's meat, flour and bread, and vegetables; the preparation of what may be called "grocery lines" such as tinned and cooked goods, confectionery, and ready-to-serve meals; and, finally, the preparation and serving of meals themselves.

Sir John Orr, in his lecture a fortnight ago,[1] put before us the necessity for considering the nutritional value of the foods we eat and the importance of giving due consideration to the vitamin and salt contents of diets. Hitherto the direct interpretation into diet sheets of such lists as he showed us would have remained solely the duty of the housewife. She would have taken the raw materials and would have cooked and baked, stewed and roasted, and would have thereby interpreted and satisfied to the best of her ability the demands of the dietitian. To-day the situation is entirely different. Certainly the final choice is left to the household caterer, but between the land and the kitchen there has developed this food industry which, in part or whole, prepares much of the food provided by the land. For better or for worse this tendency grows, for town dwellers have little or no connexion with raw material, and those who live in the country rely almost equally for their supplies on intermediate distributors.

Mass Production of Food

One of the outstanding features of the age is the variety of goods always available. To give full rein to our whims and fancies is not in the national interest in times of war, and our Government has taken great care to see that we are not in a position to please ourselves. As the Minister of Food has said, the question of the ration of sugar depends not only on the availability of shipping space but also on the availability of American dollars. Economic conditions thus limit the range of raw materials available. The food industry can in such times make the best use of the goods that are obtained, whether from our own land or from over-seas. This mass production of food has made possible a more intensive study of food problems from the scientific point of view than could have been carried out had the industry continued to be in the hands of a large number of small concerns. The tinning of fruit is an example. Studies conducted by or on behalf of large firms have resulted in a definition of those conditions of the tinning process which ensure the retention of the maximum amount of vitamin potency. A far greater destruction of the vitamins occurs when fruit is prepared and cooked in the home.

The first function of the food industry concerns the group of primary products. The story of the loaf is not so simple as some assume. The whiteness of the flour depends on the amount of the outer layers of the grain included; the whiter the flour the greater the proportion of the centre of the kernel. There is, however, always a proportion normally discarded as flour and sold as fodder for livestock generally. In times of war it is usual for governments to insist that more of the whole grain be included in the flour for baking. In the amount of vitamin B_1 in the part of the grain normally discarded lies possibly the most important reason why brown or wholemeal bread should be eaten during times of nerve tension. But there is one aspect of the "whole bread" problem which is not often considered by those who advocate the use of brown bread. It is not easy for the modern bakery to change over from the production of white bread to that of brown. The doughs made from brown flour have characteristics and physical properties which make it impossible for the machinery to deal with them without modification, and such modifications cannot be brought about, even in peacetime, by a wave of the hand.

Although the miller has prepared a product as standard as possible of its type, the baker has to apply the knowledge gained by rule-of-thumb methods, now interpreted by the chemist, in order to produce a loaf of standard appearance. Every step has to be controlled: the making of the dough, the fermentation, and all the other pro-

* The lectures will be published *in extenso* by Messrs. G. Bell and Sons, Ltd., of York House, Portugal Street, W.C.2.

[1] *British Medical Journal*, June 22, p. 1027.

cesses, even down to the wrapping of the loaf. It is only by this close control that a particular bread can be produced as unvarying and as cheaply as it is to-day.

Economy in the Factory

The proper utilization of milk is interesting and complex. A moment's consideration will show that an intermediary between producer and consumer is absolutely necessary. The large dairy factories must be prepared to transform the surplus milk of the "flush" season into other edible goods. Besides the main function of taking milk from the farms and cleaning it and pasteurizing it, butter, cream, and cheese, and condensed and dried milks have to be made; and by-products—lactose, dried whey, and casein—have to be worked up. Another aspect of the milk problem is the manufacture of ice cream, made in millions of gallons annually, standardized in composition, of a bacteriological purity far exceeding that of the ordinary milk supply, and one of the safest and most nutritious foods available.

The preparation of potatoes in the ordinary way for boiling—a method of cooking typically English—consists in peeling and eyeing. Factory procedure is different from that of the home. At the factory the potatoes are introduced into a bowl having a corrugated or roughened inner surface and a spinning bottom plate which is flooded with water. The friction between the potatoes and the bowl causes the removal of the skin. By another method the potatoes are introduced into a travelling oven, where the temperature is about 1,200° C., for eight seconds. This results in the shrivelling of the skin, and then the potatoes are run down an inclined plane with a stream of water and the shrivelled skins are rubbed off. With hand peeling there is a loss of 22 per cent., with machine peeling a loss of 7.8 per cent., and with furnace peeling a loss of 3.5 per cent. In each of these cases there is careful eyeing, for which there is no mechanical method available.

An example or two from the "grocery line" will also show that the national economy is favourably affected by full utilization of factory-produced goods. The loss by home cooking of an average ham is 15 to 20 per cent., made up of fat and other important constituents. The cooking of hams under standard controlled conditions has been intensively studied, and the loss of total ingredients has been found to be from 6 to 10 per cent. There is a further economy in the latter procedure. Any fat which rises to the surface of the cooking vat is skimmed off under controlled conditions and subsequently purified to yield an edible fat. The fat which rises to the surface when boiled puddings or Christmas puddings are cooked might equally be instanced.

Another example of economy which might be mentioned is in the squeezing of an orange to make an orange drink. The housewife normally discards not only the peel but the pith. The food factory utilizes the peel to make glacé or candied peel, and the pith to produce pectin, an important constituent of jams.

Preparation of Cooked Food

An aspect of the food industry which is assuming greater proportions every year is the preparation and distribution of cooked foods: meat pies and fruit pies, cakes and confectionery of all kinds, table jellies and sauces, and that further group which is a distinct aid to the housewife—namely, the ready-mixed cake and pudding powders and prepared short and flaky paste. Certainly the housewife in making a cake from flour and eggs and fat and fruit can do so as cheaply, in reference to her own household budget, as by buying a cake mixture, perhaps even more cheaply. But the making of one cake or even of several results in far greater wastage of raw materials than if the mixed ingredients are used. Certainly the most economic method from the national viewpoint is the purchase of ready-baked cakes, for the amount of fuel consumed, either directly or indirectly, in the preparation and baking is less with the mass manufacture than with the home-produced goods.

In a controlled test, using an ordinary gas cooker, a housewife baked a cake and twenty-four small rock cakes. The final weight was 4½ lb. The gas consumption showed that to bake a pound of cake had required 10 cu. ft. The gas consumption of a travelling oven—that is, a factory oven of the modern type through which the cakes pass on a travelling band or on trays, producing hundreds of pounds of finished goods an hour—was 1¼ cu. ft. of gas for every pound of cakes produced. Domestic cooking was therefore eight times more costly in gas usage than factory cooking.

To-day the food industry is faced with a shortening of supplies. Anyone with a discerning palate will have noted the gradual reduction of the sweetness of most tarts and cakes to be bought in shops. Other sugars, more expensive than cane sugar, have been used to replace the sugar ordinarily used. The Minister of Food has asked the food manufacturers to improvise—which means, as I understand it, to find substitutes or alternatives.

There are two distinct types of improvisation—namely, the adaptation to some new use of food products already known, and the development of some new process by which from inedible substances a food may be produced. Neither of the two is easy, and because in the past generation food has been so plentiful there has been little stimulus to proceed with the necessary fundamental work of a scientific character on which to base the investigations required. Another deterring factor has been the very efficient Food and Drugs Act, for it has been impossible to improvise and yet satisfy that all-embracing requirement that food should be of the substance demanded by the purchaser. The restriction of shipping space or of foreign credits, affecting the import of raw materials, has made it difficult to find alternatives. For example, since the restriction of cane sugar was instituted some months ago the amount of another sugar—glucose—used in the baking trade has increased enormously. Glucose is not so sweet as sucrose (the sugar of the sugar cane and of the beetroot), but by introducing various modifications in the method of manufacture of bakery goods it can be used to replace a certain proportion of sucrose. The raw materials, however, from which glucose has been made—that is to say, various starches—are all-important. The only home product from which it could be made is the potato, and with this the process necessitates the primary manufacture of potato starch, quite uneconomical in this country in peacetime. From the beginning of June the supply and therefore the use of glucose are restricted, and an alternative sugar is thus made unobtainable.

Food from Inedible Material

In a somewhat similar category is fat. Apart from butter, and leaving aside suet and mutton fat, which have very definite characteristics, no fats are produced in this country which can be used as cooking fats. Baking compounds and margarines are made from oils expressed from various oil seeds and from whale oil, properly refined and treated by a process which raises the melting point so

that they become solid or semi-solid at ordinary temperatures and can be blended to suit particular purposes. Much has been done since the outbreak of war to "make do" with available fats in the baking trade, but here again the supply is being restricted and the difficulty of the baker becomes more and more apparent. Cakes and pastries are not essential to keep body and soul together, but personally I am a great believer in the psychological value of variety in food materials or variety in presentation.

The "Ersatz" coffee and tea of Germany are examples of alternatives. The coffee is essentially roasted malt and the tea a mixture of various leaves of shrubs. Both are palatable but with no resemblance to the substances which they are to replace, lacking the stimulating action given to the normal infusion by the caffeine present in the coffee bean and in the tea leaf.

The production of food from inedible substances is quite possible in respect of certain goods. An interesting example of the transformation of an inedible into an edible product is to be found in fats. Such bodies as liquid paraffin are not absorbed by the human system. Taken by the mouth they pass away absolutely untouched. But by a series of chemical changes they can be transformed into long-chain fatty acids and then into chlorides which have a constitution similar to that of the chlorides of edible fats. They can then be chemically combined with other groupings and in this form are digested by the human stomach.

Synthesized Protein

The shortage of meat means lack of protein, and as long ago as the last war there were great factories in Germany for the production of protein by a biological method. Yeast used in the fermentation industries and in bread-making is a small micro-organism and contains a proportion of protein matter. By appropriate treatment this protein can be made available, as in the type of product known as marmite. Certain yeasts have the power of synthesizing much larger quantities of protein, and the protein industry of Germany depends on their activity. Germany by her planned policy has developed these industries, although I have no doubt that she prefers the temporarily available beef of Denmark and Holland to the protein provided by yeast under the guidance of her chemists.

I will say almost nothing about the last of the three indicated functions of the food industry, which is the preparation and serving of meals. The large middle-class restaurant and the "chain" teashops are all run on the same principle as the food industry itself—the avoidance of waste and the economical preparation of food. Each large restaurant is a small factory in itself, and the teashops, which are fed by a centralized kitchen, are really the retail distributors of that kitchen. Mechanically controlled ovens, mechanical egg poachers, mechanically washed china, thermostatically controlled frying baths, all tend to that economical use of the raw materials and labour which is so essential in these days of stress. There are other aspects of quality and purity and of scientific control concerned with the safety of the factory-produced food which I might have stressed. The best chef in the world or the most careful housewife cannot guarantee the bacteriological purity of the product as can the large food firms.

The one conclusion to be drawn is that mass production, mechanization, and scientific control all combine to reduce waste, whether of materials, of fuel, or of man power. In the words of the Postmaster-General in a recent speech, they help "to do more, making use of less."

THE INTERNATIONAL STANDARDS FOR ANTITOXINS, ANTISERA, AND TUBERCULIN

The international standards for sera and bacteriological products are held, on behalf of the Health Organization of the League of Nations, by the State Serum Institute, Copenhagen, which has hitherto furnished samples to the laboratories, institutions, and research workers requiring them in different countries. That supply being now interrupted, the Health Organization of the League has requested the Medical Research Council to allow samples of the British standards for these products held at the National Institute for Medical Research, Hampstead, to be furnished to those who have hitherto received the international standards from Copenhagen. The Medical Research Council has agreed to make this arrangement to meet the emergency and to prevent the complete interruption of this international service. The British standards in question are either part of the same materials as those kept as international standards in Copenhagen or have been repeatedly verified by the British and Danish Institutes to ensure that the units determined in terms of the British standards are exactly equivalent to the international units.

The following are the standards available:

1. *Identical in Material with the International Standards.*—Staphylococcus antitoxin; gas-gangrene antitoxins (*perfringens, Vibrion septique, oedematiens, histolyticus*); anti-dysentery serum (Shiga); anti-pneumococcus sera (Type I and Type II); old tuberculin.

2. *Different in Material, but with Identity of the Unit Indication Confirmed Twice a Year at Copenhagen and Hampstead.*—Diphtheria antitoxin; tetanus antitoxin. The National Institute at Hampstead can also supply on request a standard solution of diphtheria antitoxin for use in the flocculation test.

The stocks of these standards held at Hampstead are adequate to meet all demands, with the exception of the standards for anti-pneumococcus serum, Type I and Type II. The remaining stocks of these two standards are low, both at Copenhagen and at Hampstead, and it is requested, therefore, that demands for them be restricted to essential needs. It is further requested that, in order to conserve the stocks of these standards so far as possible, laboratories will co-operate with the Hampstead Institute by establishing local laboratory standards for these two anti-pneumococcus sera by adopting for routine testing samples of the anti-pneumococcus sera Type I and Type II, the potency of which has been determined by comparative tests made with the relevant international standard preparation.

Former recipients of the international standards who wish to be supplied during the interruption of the issues from the Copenhagen Institute should make immediate application, stating which of the standards they require and how many bottles in each case, to the Department of Biological Standards, National Institute for Medical Research, Hampstead, N.W.3, England. On receipt of this information the required supplies will be dispatched at once.

The council of the Ophthalmological Society of the United Kingdom has instituted a Treacher Collins Prize of £100, awarded triennially, for the best essay submitted upon a subject selected by the council. The prize is open to qualified medical practitioners of any nationality. The essay must be written in the English language. The subject for the second award of the prize is "Allergic Affections of the Eye and its Adnexa." The closing date for sending in essays is December 31, 1941. They should be submitted to the honorary secretary, Ophthalmological Society of the United Kingdom, 5, Racquet Court, Fleet Street, E.C.4, from whom, also, any further particulars can be obtained. No name should be on any essay, but a distinguishing pseudonym or quotation, which should also be upon a sealed envelope containing the candidate's name and address. This envelope should accompany the essay.

INDUSTRIAL HEALTH IN WARTIME

BY

H. M. VERNON, M.D.

An article under the above heading was published in this *Journal* on April 13, when it reviewed the contents of the Emergency Report No. 1 issued by the Industrial Health Research Board. The article commented with approval on the statement of the Board that excessive hours of work do not ultimately pay, owing to the induction of over-fatigue in the workers, and that rest pauses are necessary for their health, contentment, and efficiency. Since the issue of the report grave events have forced us to realize more clearly than before the paramount need for the maximum production of munitions and other war requirements. In order to attain such a result Lord Beaverbrook, the Minister of Aircraft Production, asked all employees in aircraft factories to work full overtime for seven days a week. Mr. Herbert Morrison, the Minister of Supply, instructed all Royal Ordnance Factories engaged on urgent contracts to put in two twelve-hour shifts daily for seven days a week until further notice, while Mr. Bevin, the Minister of Labour and National Service, likewise appealed for a seven-day working week. Mr. Bevin was given complete authority in the regulation of factory conditions, as the powers of the Home Secretary under the Factory Acts were transferred to him for the period of the war. He quickly realized that if the workers were to maintain health and efficiency they must have rest periods from work, and in order to assist him in stimulating and developing to the fullest extent the safety, health, and welfare of the workers he established a Factory and Welfare Advisory Board. Most of the members of this Board represent trade unions or Mr. Bevin's own Ministry, and only one of them, Air Vice-Marshal Sir David Munro, is a medical man with an expert knowledge of industrial health. The composition of the Board therefore compares unfavourably with that of the Health of Munition Workers Committee appointed by Mr. Lloyd George in 1915, the membership of which included six medical men and three Inspectors of the Home Office Factory Department.

Hours of Work, Output, and Invalidity

Mr. Bevin states that, with the assistance of his Board, he soon hopes to publish suggestions to industry for so arranging the hours of work that industrial fatigue can be reduced to a minimum, and that he is particularly concerned about women and young persons. Such suggestions ought to take the form of compulsory orders. They are urgently necessary, for the fairly reasonable hours of work for women which were sanctioned by the Home Office during the first eight months of the war have since been greatly exceeded. These previously sanctioned hours ranged from fifty-four to fifty-seven a week, and work on Sunday was hardly ever permitted. There can be no doubt that such hours represent the longest for which women can work if they are to maintain their production at a steady maximum. It is true that when longer hours are suddenly imposed, as they were during the recent drive, the women achieve a bigger output for a very few weeks, but, as the Health of Munition Workers Committee pointed out, "misguided efforts to stimulate workers to feverish activity in the supposed interests of output are as useless as would be the cheers of partisans encouraging a long-distance runner to a futile sprint early in the race."

The statistical evidence on output at the disposal of the Health of Munition Workers Committee was collected over a period of nearly two years in factories where various lengths of working week were tried, and it conclusively showed that the maximum hours for which the women could work effectively were fifty-five or less a week, while it was found to be most important that they should have at least one day of complete rest per week. In the earlier stages of the war the women were in some cases asked to work for seventy-five hours a week, while sixty to sixty-nine hours were common. In consequence they suffered much from sickness. In successive three-month periods about a third of the women dropped out altogether, largely from ill-health, and had to be replaced by others. A medical examination of 2,500 women remaining at work in various factories showed that more than a third were suffering some fatigue or ill-health, while 7 per cent. of them showed marked fatigue or ill-health. Moreover, these women could only struggle along by absenting themselves from the factory for something between one day a week and one day a fortnight in order to recuperate.

Of the women who dropped out of the factories entirely we have no specific knowledge, but there can be no doubt that a number of them died, especially from phthisis. Between 1913 and 1916 the proportion of women dying from this disease increased from under 35 per cent. of the total deaths to over 42 per cent. of them in industrial towns such as Birmingham, Manchester, and Sheffield, while in non-industrial towns it did not increase at all, or even fell. The records of the Registrar-General show that in the country as a whole young women, aged 15 to 24, had a special susceptibility. Their mortality rate from phthisis between 1911–14 and 1918 rose 50 per cent., and though this rise may have been partly due to malnutrition and overcrowding, it is a significant fact that the older women, aged 45 and upwards, showed practically no rise. These women, in contradistinction to the young women, seldom worked in munition factories, as they had to stay at home and look after their families.

Need of a Weekly Day Off

The Health of Munition Workers Committee specially deprecated Sunday labour, and considered that "the discontinuance of Sunday labour should be of universal application and should extend to all classes of workers, except that where the work must necessarily be continuous special arrangements will be necessary." The evidence at the disposal of the committee did not indicate the evil of Sunday labour as such, but merely the bad effects of a seven-day working week. Health could be fairly well maintained if each worker were guaranteed *one* free day per week. By a system of relays it would still be possible to keep the industrial plant running continuously, in accordance with our urgent needs for war supplies. For instance, the assignment of a group of seven women in each shift to a set of six machines would mean that every woman could get her weekly holiday.

The health of the men during the last war was far better maintained than that of the women, in spite of their excessive hours of work. This was partly owing to their better physique and powers of endurance, and partly the result of past experience of industrial work which most of the women lacked. The men had found out for themselves the futility of inducing a condition of over-fatigue, and they had learnt that in order to avoid it they must adopt a somewhat slower rate of working when they were on very long hours. Many of the men put in seventy to eighty hours of work per week for months on end without much ill-health, but this did not mean that they were working efficiently. They were simply being paid by their employers at a higher wage for an amount of work which they could have done equally well in about sixty hours a week, or less. The Health of Munition Workers Committee at first recommended that the average working hours for men should not exceed sixty-five to sixty-seven a week, but they subsequently concluded that such hours are too great except for quite short periods. Indeed, the statistical evidence collected for the committee showed that men engaged on fairly heavy work attained their best production on a fifty-five-hour week.

A medical examination of 1,540 men (aged 41 or more) drawn from a number of munition factories showed

that 17 per cent. were "slightly below normal," while 5 per cent. were "much below normal" and 0.4 per cent. were in "bad" condition. The 1,500 boys examined (at ages of 14 to 17) were healthier than the men, in spite of the fact that most of them were working for sixty to seventy hours a week. This was probably because of the shorter periods for which they had been engaged on munition work and the lighter character of their occupations.

Reports of Societies

PROTECTION OF THE SOLDIER IN WARFARE

A meeting of the Section of Surgery of the Royal Society of Medicine was held on June 26, under the chairmanship of Mr. ZACHARY COPE, for a discussion on the protection of the soldier in warfare, or what the chairman called "the physical prophylaxis of wounds."

Mr. KENNETH WALKER said that he had been interested in the protection of certain vital areas of the body ever since, in the last war, he noted how many men were killed in the front line by small missiles entering the chest and ripping up one of the great blood vessels or the heart. The principle that it was worth while protecting the head by means of a steel helmet had been recognized, but there was no reason why protection should stop there. The old objection to the use of armour—that it was impossible to add the necessary weight to the already overloaded soldier—no longer held good. The man to be protected did not march, but was carried by a lorry, a motor-bicycle, or an aeroplane. Moreover, steel of great tensile power was now available, as well as other suitable materials. In the last war the daily press mentioned many examples of men who had been saved from almost instantaneous death through carrying a cigarette case or a book in the breast-pocket; but for one lucky escape there were a hundred deaths. In the last war 60% of the wounded arriving at the casualty clearing stations were put out of action by missiles other than bullets, mostly by trench-mortar splinters. In all this equipment of armour it was necessary to bear in mind the mobility of the soldier. Armour to protect a man against armour-piercing bullets necessitated a weight of 20 lb.

Mr. Walker showed specimens of compressed fibre and other materials, including bakelite, which had the same tensile power as aluminium and was half its weight. It would protect against shrapnel; probably it was not suitable for body armour, but it might be utilized in the form of an inner skin for certain parts of aeroplanes and other machines. Even if the use of this material were confined to backing the box respirator it would prevent many fatalities. That the German staff had long been interested in body armour was evidenced by the picture of a German sentry in 1917 the front of whose body was protected by the best available armour of that period.

To summarize his conclusions, just as in factories and mines there was close co-operation between the medical profession and the managers with the object of protecting workers against illness and injury, so there should be a far closer co-operation than at present existed between the surgeon treating the wounds and the naval, military, and Air Force authorities. Only by a close study of the type of injury from which a particular branch of the Service suffered could the necessary methods of prevention be devised. Many pilots at present were coming down with superficial and strictly localized burns of the hands, forearms, face, and neck. That observation ought to be followed up immediately by seeing whether something could not be done to prevent this, perhaps by the provision of emergency gauntlets or even something that could be put in front of the face. If anything was to be achieved along these lines the initiative must come from the medical profession. One reason why this subject of better protection was being completely ignored in certain quarters was that there was no single authority to deal with it. He had been inundated with letters from people who had failed to obtain any consideration for certain suggestions that had been brought forward. Some of the suggestions were no doubt ridiculous, but others ought to have been considered. He added that last week he received from America a letter stating that during the Hitler regime three unsuccessful attempts had been made to induce a certain American inventor of armour to equip the German armies.

Sir RICHARD CRUISE described his duralumin visor for attachment to the steel helmet, an account of which was given in the *British Medical Journal* of May 18 (p. 825). From figures which he worked out in 1917, from 50 to 70 per cent. of all war blindness was preventable. The new visor aimed at simplicity and effectiveness, and he hoped that no steel helmets would be issued in the future without this attachment.

Sir HAROLD GILLIES suggested that the War Office should consider the question of extra windscreens which would protect the lorry or ambulance driver and the motor-cyclist. A very frequent injury in war was burns of the hand due to the placing of the hand in front of the face when exposed to flame. The result was extensive burns of the back of the hand, with stiff joints, if nothing worse, so that the man was useless for the rest of the war. A gauntlet—a leather glove was not sufficient protection—would be of value without interfering with the use of the hand in driving.

Colonel MAX PAGE said that one thing which must not be done was to add to the weight carried by the soldier. He did not want to be destructive in any way, but he did not think there was any evidence that the Germans were using armour for infantry troops in this war. He added that the perforating type of wound had been very much more in evidence during the last few weeks than in the earlier fighting in the Maginot Line.

Surgeon Rear-Admiral G. GORDON-TAYLOR spoke sympathetically in favour of the protection advocated by Mr. Kenneth Walker and Sir Richard Cruise.

Sir THOMAS DUNHILL said that the question seemed to lie as between the protection which Mr. Walker had so ably set forth and the caution which Colonel Page had expressed, that nothing should be done to interfere with the mobility of the soldier. It was a case for getting all the evidence available from both points of view, and putting forward the conclusions in such a manner that they would at least be sure of consideration.

Mr. T. B. LAYTON was absolutely opposed to the addition of any weight to the British soldier's equipment. It made no difference whether he carried it himself or it was carried in the motor lorry. He referred to a comparatively small engagement in the last war, when 70,000 men were engaged in the capture of Beersheba. If the weight carried were increased by 14 lb., a figure mentioned by Mr. Walker as the weight of a special jerkin, it would mean for such a force an extra weight of 400 tons, requiring forty more ten-ton lorries, with all the petrol and other services. On the other hand, he had been impressed by the protection afforded by something in the pocket covering a vital area, and if Mr. Walker could produce something weighing 2 oz. which would cover that vulnerable area he believed he would get it through.

Colonel A. E. PORRITT remarked on the relative absence of chest and abdominal cases in the base hospitals. Mr. ASLETT BALDWIN urged that petrol tanks should be better protected if possible. Many men were burned by the petrol catching fire. Mr. JOHN BUNYAN suggested that the plane surface of the protective armour should be broken up; it would more efficiently deflect a missile and afford more protection.

Mr. OGIER WARD, in a communication given by Mr. Kenneth Walker, said that many casualties were from missiles directed from above. The natural reaction of the human being in such circumstances was to crouch down, and therefore there had been a great increase in wounds of the buttock and back and back of the neck. The British helmet, he thought, was inferior in design to the German. It afforded no protection of the temple region and no protection behind. He suggested that a curtain of chain mail might be attached to the back of the "tin hat," coming down as far as the seventh cervical

vertebra, rather like what was worn in the Tropics, dangling behind the topee, to protect from the sun. Another question was why the Tank Corps suffered so much from badly comminuted fractures of the femur, and very few wounds of the upper part of the body. That was a question which should be studied. Some alteration in the design of tank protection might save these men from that common form of wound.

Mr. E. D. D. DAVIS said that the British helmet was every bit as good as the German. The German helmet introduced in 1916 was 14 oz. heavier than the British, and this added very considerably to its discomfort. Harvey Cushing in the last war published a number of photographs showing extensive injury to the helmet, yet the wearer sustained only scalp wounds, not penetrating ones. The German helmet was also more easily seen, and its contour was such that it was less able to ward off missiles. Mr. MCADAM ECCLES said that he thought Mr. Kenneth Walker was right, and that real protection must be given to the soldier even if it meant more weight. In warfare in this country it would not be necessary to have the protective equipment carried so far, or at least for the men themselves to carry it so far.

Mr. KENNETH WALKER, in reply, quoted a war correspondent in Belgium to the effect that the Germans were using body armour. On Mr. Layton's point it would be possible to produce something weighing two ounces to cover the vital area over the heart, and to give more efficient protection than a book, or flask or anything kept in the breast pocket. But he did not want to go into details. All he asked was that these various suggestions should be considered by the profession. The medical men who were called upon to deal with the wreckage of war were in an outstanding position to initiate these measures. Each branch of the Service presented its individual problems, and the study of wounds should be followed by a study of all possible methods of protection. For the last three months he had been forcing his way into various Government offices seeking information and doing his best to arouse interest in this subject, but unless the profession as a whole took an interest there was little chance of anything being done.

Resolutions

The following resolutions were proposed by the president and unanimously adopted:

"That this representative meeting of the Royal Society of Medicine, after a full discussion of the question, is emphatically of the opinion that the physical protection of the members of the fighting Forces can and should be improved by a closer collaboration between the medical profession and the appropriate technical experts of the Admiralty, War Office, and Air Ministry."

"That this meeting of the Royal Society of Medicine resolves that the Council of the Society be asked to consider the formation of a special committee to this end, according to By-law 21. Furthermore, as the matter is, in the opinion of this meeting, one of extreme urgency and importance, it is hoped that the president may use his emergency powers and approach the Government with the offer of the Society's co-operation at the earliest possible date."

A full account of the meeting will appear in the July issue of the Society's *Proceedings*.

BLOOD DYSCRASIAS IN TREATMENT OF V.D.

At a meeting of the Medical Society for the Study of Venereal Diseases on June 22 Lieutenant-Colonel E. T. BURKE read a paper on blood dyscrasias in the treatment of venereal diseases.

Out of 3,250 cases of syphilis treated at the Whitechapel clinic over the period 1934-8 there were recorded thirteen cases of blood dyscrasia—meaning any condition in which damage had been done to the blood-forming mechanism. Seven were in males and six in females, the average age of the men being 49 and that of the women 30. Five of the patients were in the acute or early stage of syphilis, the others in the chronic or late stage. All had received sulpharsphenamine. The average time between the last injection and the occurrence of purpura was fourteen days, the shortest period being one day and the longest seventy-seven days. Ten of the cases were of thrombocytopenia, five being mild, two moderate, and three severe. The other three were cases of agranulocytosis, one mild and two severe, the two severe cases proving fatal. There was no relation between the amount of the drug given, the intensity of treatment, and the blood dyscrasia. It appeared that syphilis by itself or arsphenamine by itself tended to cause purpura because of the effect on the non-cellular elements constituting the blood coagulation complex, and when the two acted together that tendency must be still more pronounced. The most important factor causing purpura appeared to be the effect which the arsphenamines were capable of exerting on the bone marrow. Colonel Burke added that up to the present no instance of blood dyscrasia in the form of purpura had been encountered at his clinic from the use of the sulphonamide drugs in the treatment of gonorrhoea. The general impression had been gained that where there occurred symptoms such as malaise, nausea, and rashes there would be increased capillary fragility, increased bleeding time, but only rarely, if ever, any diminution in blood platelets.

Dr. DAVID NABARRO commented on the rarity of cases of blood dyscrasia among children. Agranulocytosis and thrombocytopenia were not often seen in children, probably because their blood vessels were in a better condition than those of adults, especially adults who had contracted venereal disease. Dr. MORGAN RICHARDS said that lately he had encountered three cases—one of aplastic anaemia, which proved fatal, and the others of thrombocytopenia, one in the acute and the other in what might be called a chronic stage. His case of acute thrombocytopenia showed prodromal symptoms in the form of an indefinite dermatitis, which the patient himself thought to be a privet rash. He developed an acute purpura, in which his platelet count fell to the low figure of 1,500, but he attended as an out-patient and carried on his work as a postman.

Lieutenant-Colonel T. E. OSMOND stressed the dangers of sulpharsphenamine, and said that where possible intravenous therapy should always be given with neoarsphenamine. The appearance of a dermatitis was a warning that no further doses of arsenic should be given to the patient. Major C. J. H. CAMPBELL said that his interest in the blood picture had been aroused recently on seeing a number of dermatoses occurring as a result of treatment with the sulphonamide group of drugs. In these severe dermatitis cases the red blood cells, the platelets, and the haemoglobin were up to a high standard of normality, but there was a falling away in the white blood count and a relative lymphocytosis seemed to be present.

Colonel BURKE, in reply, said that there did not seem to be any relationship at all between the intensity index and the severity of the blood condition. One never knew when or in whom this blood dyscrasia was likely to occur. He fully agreed that once a patient had dermatitis, arsenic in any form should be stopped altogether.

DRIED PLASMA

At a meeting of the Pathological Society of Manchester on June 13 Professor T. B. DAVIE of Liverpool opened a discussion on the preparation and use of dried plasma.

Professor Davie said that blood had been used in the past in conditions—for example, shock—in which plasma was required. Struma defined shock as "the clinical condition characterized by loss of circulating blood volume brought about by the tissue anoxia which results from inadequate circulation." In circulatory failure due to shock a number of factors—such as loss of circulating blood volume, capillary paralysis, and heart failure—formed a vicious circle, and the rational treatment was to break this by removing the cause and restoring the blood volume. Saline and gum arabic were of only temporary value, and whole blood added corpuscles leading to a further concentration of the already concentrated blood and to extra cardiac embarrassment. The rational treatment was to replace with fluid containing blood protein, by serum or plasma transfusion. Dried plasma was more stable than blood; owing to its small bulk it was easily transportable and could be given in concentrated form. Because of

expense the method of drying had to be a simple one. Blood was drawn and kept at 2° to 4° C. till optimum sedimentation occurred (about three days). The citrated plasma was then aspirated off. It was dried by suction by a filter pump, the plasma being kept in a water bath at 37° to 40° C. The blood used for the plasma was Group 1, but more recently blood of Group 2 had been used. All clinical trials had been made with plasma dried by the simple laboratory plant, but further work was being carried out with an enlarged plant composed of four drying units. This had a condensing unit and a Lennox rotary pump. The temperatures and pressures were controlled by manometry. The glass container for the plasma had its temperature gradient estimated, and a temperature inside the bath of 55° C. was allowed. The resultant preparation contained 4 to 6 per cent. moisture; to chemical tests it was unchanged after three months.

There were certain disadvantages in the process. The water content was high, and this might make the preparation less stable. Sterility was difficult to ensure with large quantities of plasma. The process was carried out aseptically and the clinical sterility of the product was assumed if the original product was sterile. Attempts to filter the plasma through Seitz filters were not always successful. The *p*H of the samples was markedly alkaline, but this did not appear to be harmful. The addition of 6 per cent. glucose only made a trivial decrease in the final alkalinity. The high citrate content of the sample was against its use in concentrated form, though it had been shown that quantities of sodium citrate up to 5 grammes were harmless to man. Professor Davie emphasized that matters were still in the experimental stage. One difficulty was that of obtaining bacteriological sterility, although there was clinical sterility. The use of a filter and an inoculation hood gave a better chance of sterility. There was justification for continuing research in this direction. Uses for dry plasma were: (1) as emergency stock for war and air raid casualties at home; (2) in casualty clearing stations, where reconstituted plasma could be used from stocks of the dried powder stored in base hospitals; (3) in the Navy, as it required less bulk and glass containers were liable to be broken in naval engagements; (4) in surgeons' and obstetricians' bags for real emergencies, especially in large country practices.

Dr. G. STEWART SMITH stated that he had tried the Seitz filter with little success. He now kept a stock by drawing plasma into an equal volume of normal saline and keeping it in a sterile container. He wondered if the *p*H of the plasma given played an important part in the production of reactions after plasma transfusion. Another problem was to secure the triple distilled water that should be used in making up the plasma solution. There was much American literature stating that plasma would keep four to six months, either neat or in saline; was this Professor Davie's opinion? Professor BAKER remarked that he had used a similar apparatus, but was troubled by the running-back of water into the partly dried serum. He inquired if the water content of the final product could be reduced by a high-vacuum pump. Dr. WILKINSON asked what the temperature and pressure were inside the flask. There was no known way of sterilizing some preparations in dried forms. Other speakers asked how much plasma was dried per hour and how the dried plasma got into the patient.

Professor DAVIE, in reply, said that he used stored plasma saline for general use, as this appeared the best. There was a place for dried plasma, but it could not replace plasma saline. He did not think that triple distilled water was essential; sterile distilled water could be used. At present he accepted the American figure of the stability of dried plasma. The water content of the final product could be further reduced by means of a high-vacuum pump; some of the moisture might be bound chemically to the citrate. As regards the actual temperature inside the flask, they were now using thermo-couples to obtain the temperature gradient. The amount of plasma that could be dried per hour with the small plant was one litre per bottle. It was given by dissolving the dried powder in saline, glucose saline, or distilled water in a sterile bottle—it dissolved with shaking—and under conditions of surgical sterility.

Correspondence

The B.M.A. Diet Booklet and Safe Milk

SIR,—I do not wish to appear presumptuous if I humbly offer my congratulations to those responsible for the excellent booklet on diet which the Association has just issued. But in offering such congratulations I wish in all sincerity to make one serious criticism. In the advice given on milk it is rightly stressed that milk must be *safe*, and this is followed by two alternative varieties of safe milk—namely, "pasteurized" and "tuberculin-tested." Now the latter variety cannot be regarded as safe, and without starting off once again the controversy which has been carried on in these columns for many years I wish simply to ask if the official policy of the B.M.A. has been altered in this respect. As recently as 1937 a leading article in this *Journal* (April 17, 1937, p. 814) described the statement "that milk from tuberculin-tested cows is safe" as a fallacy. The article went on to say: "So it is: safe from the risk of causing tuberculosis but not from the risk of carrying a number of other different infections." Later on comes the statement: "By all means let us have milk from tuberculin-tested cows . . . but let us in addition protect ourselves by pasteurization against the danger of its contamination from human or other sources."

These statements seem to me pretty definite, and although I have followed the ever-increasing literature on the milk problem to the best of my ability I have seen nothing in the past three years to warrant the belief that the dangers of tuberculin-tested milk are any less now than they were then. To-day is not the time for trivial quibbling, but this is a matter of some importance to the health of the nation. Is it too much to hope that the "safety" of tuberculin-tested milk be categorically denied by the Association, and that in a new edition of the booklet the offending statement be altered?—I am, etc.,

London, W.1, June 18. ALAN MONCRIEFF.

*** We submitted Dr. Moncrieff's letter to Professor RALPH M. F. PICKEN, chairman of the Public Health Committee of the B.M.A., and he replies as follows:

I am glad to have had the opportunity of seeing Dr. Alan Moncrieff's letter. As chairman of the Public Health Committee of the Association I am in general sympathy with his point of view, but the policy of the Association as decided by the A.R.M. does give some recognition to the degree of safety which tuberculin-tested milk ensures, while at the same time the view has been expressed as recently as last year at Aberdeen that the Council should take effective action to persuade members of the Association to utilize their personal and professional opportunities to instruct the public in the value of pasteurization of milk.

There are one or two things we have to remember. By far the greatest danger of milk, as measured by days of disablement and by death, is tuberculosis of bovine origin. Epidemics of typhoid, paratyphoid, scarlet fever, septic sore throat, diphtheria, dysentery, food poisoning, etc., are dramatic and impressive when they occur, but taken in gross after a long period of years their consequences are trivial as compared with the steady damage done by the bovine tubercle bacillus. Another consideration is that it is not easy to organize the pasteurization of milk over wide areas, now increasingly populated during the war; but it is possible, and indeed not impracticable, to extend tuberculin testing of cattle into these areas even in wartime. It would therefore be impolitic on our part to pin our faith entirely to the one remedy of pasteurization when very much could be gained if the public could be persuaded at least to insist on their milk being from tuberculin-tested herds. What we have to look forward to some time in the future is a state of affairs such as exists in New York State, where almost all the milk is both from tuberculin-tested herds and pasteurized.

The Wage-earner's Diet: Risk of Malnutrition

SIR,—The time approaches when the stamina and ability of our people for supreme effort will be tested to a degree which few can visualize. We must therefore organize and build up our resources of human energy.

There have been references to the need for "equality of sacrifice." We must watch carefully lest in a period of rising prices our lower-paid workers suffer in health and energy through deterioration in their dietary standards. Many even now are unable to buy the necessary minimum of the protective foods, and so may fall an easy prey to the pestilences that accompany war and which spare no section of the population. "Equality of sacrifice" must start only after the basic food requirements are met. Any other policy must spell disaster.

We know that an increase in the price of milk always means a decrease in the consumption of milk among the poorer sections of the community. This decline in consumption applies to all our protective foods. Let us therefore make the fullest use in the towns and in the country of that wise permissive legislation which makes possible the supplementary feeding of our school children by milk and meals. Let us extend such communal feeding with its economy and many advantages to health. Above all, let us make certain that prices of the essential protective foods are kept within the reach of the lower wage earners. With this achieved health and morale will be maintained.

The Children's Nutrition Council has recently published in the Press a statement of the problems discussed above. The Scottish branches of the council are in entire agreement with the views expressed by the distinguished signatories of that letter.—We are, etc.,

(For the Children's Nutrition Council)

JOHN ORR, Hon. President, Aberdeen and Glasgow.
ROBERT GREIG, Hon. President, Edinburgh.
ERIC DOTT, Chairman, Executive, Edinburgh.
A. H. MCGEACHY, Chairman, Executive, Glasgow.
E. W. H. CRUICKSHANK, Chairman, Executive, Aberdeen.
STANLEY DAVIDSON.
ROBERT S. AITKEN.

June 24.

Gastric Disorders in the Services

SIR,—Dr. Philip Willcox, in his paper on gastric disorders in the Services in your issue of June 22, says that there is need for a large-scale investigation of this problem. At the request of the Royal College of Physicians we have been investigating during the past six months the problem of gastro-duodenal disease in the Army. Some three hundred cases have been investigated in great detail, from the sector, military, and other hospitals, and, although the majority of the cases were from the B.E.F., samples of local sick have also been included. A proposed extension of the investigation to cases in the base hospitals in France had, of course, to be abandoned. The field work of the investigation has been completed, and the material is now being systematically examined with the help of Professor Major Greenwood.

Meanwhile an interim report has been furnished to the Science Committee of the Royal College of Physicians. A further report has been submitted to the War Office, together with a report embodying certain recommendations which have immediate and practical bearings upon the question of gastro-duodenal disease in the Army. Although it will be some time before all the material is analysed, we hope to publish a preliminary report on the investigation in the near future.—We are, etc.,

REGINALD T. PAYNE.
CHARLES E. NEWMAN.

London, June 27.

Recruits Suspected of Tuberculosis

SIR,—I should like to express my thanks to Dr. Ernest Ward for his instructive article in the *Journal* of June 29 (p. 1067). As a tuberculosis officer who is seeing large numbers of men referred by the military medical boards it is of particular interest to me. There is, however, one point raised in this article that does not seem to me to be clear. I infer from certain statements Dr. Ward makes that a tuberculosis officer should indicate the grade of the recruit sent to him for opinion, and that consequently some uniformity of standard is necessary among tuberculosis officers. In my experience the Board, when referring cases to me, ask only for an opinion on the chest. There is never any mention as to what grade the recruit should be allocated to. It seems to me that the final grading of recruits can only be made when all medical facts are correlated, and the only persons in possession of all these facts are those on the medical board.

At the present time, acting on this assumption, I only give an opinion on the chest, and not an opinion as to whether I consider the recruit fit for military service in one or other grade. I would be grateful if Dr. Ward would tell me whether I have understood him rightly on this point.

I may say I am glad that Dr. Ward has drawn attention to the importance of correctly assessing men who have a story of pleural effusion within recent years. In the experience of most of us who see large numbers of tuberculous people the possibility of pulmonary tuberculosis developing in such cases, especially under adverse conditions, is very real.—I am, etc.,

R. M. ORPWOOD,
Senior Tuberculosis Officer, Stepney.

London, E.1, June 29.

Light Armour in Modern Warfare

SIR,—May I express my pleasure in learning that "the late Dr. Saleeby" is still with us and therefore able to put at our disposal his knowledge of protective fabrics. While it is true that we are now in possession of steels of greater tensile power than were previously available, the necessity for minimizing weight still makes the study of fabrics of vital importance. I have already made some experiments with compressed canvas, but the fact that this is a rigid substance limits its use. I shall avail myself immediately of Dr. Saleeby's kind offer (June 29, p. 1069) to put his experience at my disposal.—I am, etc.,

KENNETH WALKER, F.R.C.S.

London, W.1, June 28.

Establishment of Lactation

SIR,—I was interested in the case report published by Dr. Hugh MacCallum (June 22, p. 1017), but cannot agree that there is any evidence at all, in the history given of the successful fifth pregnancy, that "lactation could not be normally established." Dr. MacCallum states in relation to this that "the baby weighed 8¼ lb. *After two days of breast-feeding* the baby had lost 4 oz., and as there was no sign of a sufficient milk supply being established artificial feeding was begun." (The italics are mine.)

Surely it is generally recognized (1) that an infant normally loses weight, up to about 11 per cent. of its birth weight, during the first four days or so of life; and (2) that lactation is not as a rule properly established during the first four or five days, and is often delayed until well into the second week. From the facts given about this case it would appear that, if breast-feeding had been persisted in, a suitable complementary feed also being prescribed at first, there is no obvious reason why lactation should not have been established and successful breast-feeding carried out.—I am, etc.,

KENNETH TALLERMAN.

Brentwood, Essex, June 28.

Ionization with Prontosil

SIR,—The article by Dr. John Alexander Smith in the *British Medical Journal* of June 22 on local treatment with prontosil soluble and the urgency of the times have made me decide, long before it had ever been intended to do so, to report on the treatment with ionized prontosil of a few cases at the Royal Lancaster Infirmary. The rationale of the treatment—that of local action of ions against local sepsis rather than flooding the whole body with the drug—is much the same in principle as that of Smith. The difference is that

by ionization a penetration into the septic area and through this into the healthy cells beyond is secured. Fabre-Palaprat, Faraday, Sir Oliver Lodge, Edison, Gautier, Leduc, and a host of others, including that famous surgeon Spencer Wells, experimented on ionization and used it for forcing medicaments into human tissues. The method, therefore, is at least a century old. So far as I am aware prontosil as an electrolyte has not been used before. It is obvious that the only cases which would be of any value must be chronic cases when other methods have failed. Such cases would have to be chosen to settle the point as to whether or not the drug was of any use for ionization. Again, it would not be of any use, presumably, to treat tuberculous, syphilitic, or other abscesses against which prontosil, used in the ordinary way, has no effect. It was a few months before a suitable non-complicated case reached the electrotherapeutic department.

Case 1.—Mrs. B. had a finger-nail removed for a paronychia on December 8, 1939. The finger healed but the new nail and bed remained unhealthy. When the nail was one-third grown it was soft and fluctuant with pus beneath it. She did not want the nail removed. Foments, cleansing with H_2O_2, mag. sulph. compresses, and the Kromayer lamp were used without effect. Ionization with zinc was also useless. On April 12 the finger was ionized with 3 per cent. prontosil rubrum for three minutes at 3 mA, the maximum strength she could bear. On the 16th a further treatment was given. The finger healed completely, and the nail was normal when seen a few days later.

Case 2.—May, 1940. Mrs. H. when first seen gave a history of a septic elbow of four or five years' duration. At times it was quieter than others, but for the last four months it had oozed pus. The bones were healthy on *x*-ray examination. For five inches below the elbow, over the radius, was a slightly inflamed, boggy area about three inches wide, having three sinuses about half an inch or more in diameter full of pus. The pus was expressed, the cavities washed out with peroxide, and ionization given with 3 per cent. prontosil rubrum at 4 mA for ten minutes. After five treatments the fluctuation had gone, the tissues were firm, the sinuses were showing healthy granulation tissue. One sinus had healed completely at the beginning of June; the other two were only skin deep and healing.

Case 3.—A case of chronic otorrhoea was given treatment, but little improvement was observed. Chronic otorrhoea is a wayward wench to woo at the best of times, and there are always many failures with all other forms of ionization.

In a case of septicaemia or pneumonia, when the affected tissues cannot be treated directly, it seems only sensible to arm the entire blood stream with prontosil to secure effective local action. For external abscesses, sinuses, fistulas, empyemas, for urethritis, endometritis, etc., it would appear rational to treat them locally if beneficial results are to be obtained. It is intended to treat a very stubborn gonococcal infection of the cervix which for two years has resisted all forms of treatment to obtain some definite information on this point.

The action of prontosil in the blood stream has not yet been worked out, but it must be split up. Ionization splits up drugs, part going to one pole, part to the other. By splitting up prontosil in contact with a septic focus the local action should be intensified by means of the active part of the drug being more free than by merely applying it unsplit as a local application. Not only so, but tissues in advance of the focus would be "armed." I suggest that ionization should be reserved for chronic cases of long standing when local treatment has failed. A point worth remembering is that in chronic cases the general condition of the patient would most often be poor and local treatment would not add to his toxicity. The amount of prontosil carried into the tissues during the treatment can only be negligibly small. The concentration of prontosil in the pus, in the active germs, and in the fighting and healthy tissues around the abscess must be immeasurably greater than if supplied through the blood stream. There is no doubt that ions are forced through the tissues into the general system—iodine being found in the urine in about a quarter of an hour; Leduc's rabbit experiments with strychnine, etc., all prove this. The anti-bacterial action and the healing process were intense in the successful cases quoted. To base any conclusion on this small number would be presumptuous. I hope in more peaceful times to continue the investigation. The results of others who may try ionization with prontosil would prove of great interest.

Great care and interest were taken by Miss Jewitt and her staff in the experiment, and to them my thanks are due.—I am, etc.,

JAMES STEWART, M.B., Ch.B.,
Hon. Officer, Massage and Electrotherapeutic Department, Royal Lancaster Infirmary.

Lancaster, June 23.

Extradural Haemorrhage

SIR,—I think Mr. H. H. Brown (June 22, p. 1034) was very fortunate in the result of the case he describes, as most of these cases with profound coma (which show midbrain and medullary pressure, illustrated by pupillary and respiratory changes) are usually complicated by severe brain damage. The so-called middle meningeal haemorrhage appears under three types: (1) Deep coma, no lucid interval, with signs of midbrain and medullary pressure. These cases are usually complicated by severe brain damage and basal fractures, etc., and if operation is performed it is usually unavailing. (2) The old classical type with lucid interval, which is seldom seen now, due to the different severity of head injuries since the advent of motor traffic. (3) This, I think, is the commonest type to come to operation. The cases often show little or no lapse of consciousness and are accompanied by a fissured fracture of the vault with a subaponeurotic haematoma, the result of a "safety-valve leak" from the extradural space. A case I saw at the Luton Hospital illustrates the last type. I was asked to see and explore a man with left-sided hemiplegia following head injury. The paralysis of the left arm was complete, and of the left leg and face partial; the state of consciousness was normal; slight diplopia but no pupillary changes present. *X*-ray examination showed a fracture of the temporal region. Four days after the patient was injured I turned down a right temporal flap and wiped away from the bone a moderate-sized blood clot, when a fissured fracture running into the fronto-parietal suture was seen. Trephining and syringing released a large extradural clot. No haemorrhage was now taking place and no search was made for the "indictable vessel." Twenty-four hours later the patient was able to raise the arm from the bed, and in forty-eight hours was able to lift it up vertically; the leg and face recovered in the same time; but a mild diplopia persisted for some time afterwards. The fissured fracture acted as a safety valve, and so the signs were mainly cortical. In this type of case the state of consciousness may be little or unaffected, no lucid interval or pupillary changes being seen.—I am, etc.,

C. M. SMITHIES, F.R.C.S.
Ministry of Pensions.

June 23.

Trauma and Diabetes

SIR,—The best recent review of the possibilities of a relationship between trauma and diabetes mellitus appears in *Acta Medica Scandinavica*, Supplement No. 91, 1938, by Viggo Thomsen. The author bases his very extensive monograph upon the celebrated twelve questions of van Noorden and makes a critical study of eighty-one cases hitherto recorded as "traumatic diabetes" together with minute clinical and biochemical studies of parallel series of non-diabetic and other "control" groups. The author's conclusions are as follows:

"Theoretically it must be admitted that diabetes can appear as a direct sequel to a pancreas trauma which gives rise to extensive destruction of the pancreas. Other physical traumata are unable to cause diabetes. A physical trauma may give rise to an exacerbation of existing diabetes, but the exacerbation manifesting itself immediately after the trauma is temporary only. Thus the assertion frequently set forth that a physical trauma is able to exacerbate a latent diabetes so that the disease, owing to the trauma, becomes manifest cannot be maintained."

This is, I think, the conclusion arrived at by many clinicians both in this country and in America. Yet every little while I encounter a case like the following which makes me wonder where the gap in our knowledge can be:

Throughout 1939 Thomas H., aged 31, a coal-miner, worked steadily, without a break except for a brief holiday and one sore throat, at his job. He asserts that prior to January 10, 1940, he was neither thirsty nor weak. Neither was he losing weight. These statements are emphatically supported by his wife, his parents, his eldest child, and his wife's parents.

During 1939 he did not, of course, have any medical examinations. Indeed, I cannot imagine any seemingly normal person ever having any blood examinations for tolerance of glucose. In June, 1939, he had a few days' holiday, and photographs ("snaps") show him in London feeding the pigeons in Trafalgar Square. They reveal a spare man of normal appearance. According to his doctor:

"On January 10, 1940, he had a laceration on the brow and a wound about 3 inches long on his back with some loss of tissue. The wound on the back became septic and responded very slowly to treatment. After three weeks I noticed that he looked ill and thin. He told me that he was drinking a lot at night. I found sugar in his urine and referred him to the infirmary."

In the Sunderland Royal Infirmary on March 28, 1940, Thomas H. was found to have (*a*) true and severe diabetes mellitus and (*b*) a fractured skull beneath the laceration on the brow. I advised Thomas H.'s legal representatives to claim compensation, but this procedure was inhibited at the outset by an adverse decision of the Medical Referee.

Apart from Viggo Thomsen's review of eighty-one cases I know of about twenty others on record and easily accessible. But I do not know of one more suggestive than Thomas H. I do not know of any case of alleged traumatic diabetes in which the blood sugar was done *before* the trauma, and I cannot imagine such a possibility except perhaps by a chance practice by a medical student. So whether Thomas H. is weak or strong, as a case, I think it is as strong as we shall ever get. Most people will, of course, pooh-pooh the whole affair as a pure coincidence, but Thomas H. does not so regard it.—I am, etc.,

Sunderland, June 21. G. F. WALKER, M.D., M.R.C.P.

Cyanosis and Anoxaemia in Gas-and-Oxygen Anaesthesia

SIR,—While welcoming the reiteration by Dr. R. L. Wynne (June 15, p. 972) of the fact that cyanosis may be a misleading sign in nitrous oxide anaesthesia, there are certain of his statements which I think call for comment. It is difficult to arrive at an exact definition of the term "anoxaemia," but if one assumes that it means a lack of oxygen in the blood it can hardly be contended that a normal man, when cyanosed, is not suffering from this lack. The specific anaesthetic effect of nitrous oxide appears to be slight, and the anaesthetic effects normally seen are almost certainly due to a reduction in the oxygen consumption of the tissues brought about by a reduction in the oxygen available in the blood. Therefore, in the case of nitrous oxide one cannot speak of supplying sufficient oxygen to satisfy the metabolic needs of the anaesthetized organism, since it is the very deprivation of oxygen which is the greatest factor in determining the degree of anaesthesia and the metabolic rate.

It is true that an anaemic man can maintain comfort at rest with only one-third of the normal amount of oxyhaemoglobin in circulation (a figure which is in conformity with the "line of anoxaemia" on Dr. Wynne's chart), but in this case the oxygen tension in the blood is normal—a state of affairs which certainly does not obtain during nitrous oxide anaesthesia at atmospheric pressure. A false sense of security is given by speaking of nitrous oxide anaesthesia without anoxaemia, and by representing on a chart a fixed, arbitrary, level of anoxaemia, well below the level of oxygen deprivation normally present in nitrous oxide anaesthesia, and above which oxygen want is said to be insignificant.

The fact must surely be faced that nitrous oxide anaesthesia is normally inseparable from oxygen deprivation and in all probability is largely due to it. The anaesthetist using nitrous oxide is deliberately producing anoxaemia. To what degree this may be carried and the duration which may be permitted he must decide on clinical grounds, and it is actually determined by the patient's ability to recover from this particular physiological insult.

Readers may be interested to refer to the strikingly similar articles of F. B. Pratt (*British Medical Journal*, 1939, **2**, 555) and of R. R. Macintosh and C. L. G. Pratt (*British Medical Journal*, 1938, **2**, 695), where they will find many of the same figures and examples discussed, with an interpretation along corresponding lines and free from the above objections.—I am, etc.,

Oxford, June 27. E. A. PASK.

EARLY PHTHISIS IN RECRUITS

The committee, under the chairmanship of Lord Horder, which was appointed by the Minister of Labour and National Service to advise him on medical questions arising in connexion with the examination of men by civilian medical boards appointed under the National Service (Armed Forces) Act, 1939, has completed its inquiries into the methods of detecting cases of early pulmonary tuberculosis. The committee's recommendations, which are set out below, have been accepted, subject in the case of Recommendation 1 (*b*) to a scheme on the lines proposed being found to be practicable.

Committee's Recommendations

The committee has considered methods of detecting cases of early pulmonary tuberculosis in recruits for the armed Forces. It has in particular explored the possibility of examining radiologically the chests of all recruits. The only means by which such an examination could be carried out in the case of large numbers of men would, in the committee's opinion, be by the method known as miniature radiography. The committee feels that the adoption of this method represents an ideal to be aimed at in the medical examination of recruits for the armed Forces. Serious practical difficulties, however, are involved. The necessary apparatus and a sufficient number of expert examiners could not be made available for some months, and the introduction of this form of examination would seriously delay the medical examinations of recruits. In these circumstances the committee is satisfied that its adoption is impracticable at the present time, but the committee awaits with interest the trial of miniature radiography which it is understood is about to be conducted by the Admiralty and the Air Ministry.

The committee recommends, however, that the following steps should be taken to supplement the present arrangements:

1. (*a*) Every recruit at his examination by the medical board should be required to sign a declaration indicating whether or not he has suffered from tuberculosis.

(*b*) The Ministry should, if it is found practicable, adopt a scheme by which district medical officers of health should be required—

(i) To furnish a notification to every man of military age whose name appears on the tuberculosis registers kept under the Public Health (Tuberculosis) Regulations, 1930, in order that this notification may be presented to the medical board by the man when he attends for examination; and

(ii) To furnish a similar notification direct to the Ministry for the information of medical boards.

2. (*a*) The attention of medical boards should be directed to the value of the *x*-ray examination of the chest in the detection of early cases of pulmonary tuberculosis, and urged to make use of this diagnostic method in the case of those recruits whose medical history or chest condition indicates even a remote possibility of this disease.

(*b*) Medical boards should also be advised to consider this special examination of the chest in cases of general ill-health without definite clinical signs, and also in those cases of "effort syndrome" where there is no definite indication of cardiac or psychological cause.

Obituary

PHYLLIS TOOKEY KERRIDGE, PH.D., M.R.C.P.

The early death of one so gifted with ability for research in medical science and imbued with the spirit of social service as Dr. Phyllis Kerridge has come as a great blow to all who knew her, and in particular to those with whom she worked. Phyllis Kerridge was an outstanding personality at University College, London, where she entered whole-heartedly into the student life, while at the same time pursuing a brilliant academic career, which led her from the laboratories of physical chemistry and physics to the Department of Physiology. In medical science she found scope for her independent originality of thought, and while holding a junior teaching post at the College she studied medicine.

She had graduated B.Sc.Lond. with honours in 1922, M.Sc. in 1924, and Ph.D. in 1927. She obtained the M.R.C.S. and L.R.C.P. in 1933 and the M.R.C.P. in 1937. At the time of her death she held the post of lecturer in physiology at University College, and on the outbreak of war had been seconded to the Emergency Medical Service as assistant pathologist at St. Margaret's Emergency Hospital.

For some years Dr. Kerridge held part-time appointments at the London Hospital and in the Department of Industrial Physiology at the London School of Hygiene and Tropical Medicine, where her interest was aroused in problems of hearing and speech in deaf children. Aided by her natural talent for music, she applied her knowledge of physics to these problems with outstanding success. After completing a laborious investigation among the deaf-and-dumb children in the L.C.C. schools she devoted herself to the scientific study of electrical hearing aids. She was a member of the Medical Committee of the National Institute for the Deaf, and revived and carried to success the Hearing Aid Clinic at University College Hospital, which was originally started by the late Mr. H. M. Wharry. By her endeavours in research, followed by application of results to individual cases, she made a notable contribution to knowledge and practical methods for the amelioration of the sufferings and handicaps of the deaf-and-dumb, and she did valuable work on the Hearing Aids Committee which the British Medical Association set up in 1934.

Among her many other activities Dr. Kerridge studied methods of applying artificial respiration, and materially helped in the improvement of the Bragg-Paul pulsator. She served on the Respirators (Poliomyelitis) Committee of the Medical Research Council, whose report was published early this year.

Phyllis Kerridge was never a passenger; she had definite views and co-operated actively in all her undertakings. The loss to the community of a life so full of achievement and of promise will be keenly felt.

We regret to record the sudden death of Dr. JESSIE BALSILLIE, who only last week completed twenty-five years' valuable service to the City of Stoke-on-Trent as the maternity and child welfare officer. Dr. Balsillie, who was in her sixtieth year, had not been in good health since last November, and she was away from duties for some time, returning to work in February. A native of St. Andrews, she took her M.B., Ch.B. at St. Andrews University in 1905, and later was in practice at Burton-on-Trent for six years. During her service with the Stoke-on-Trent Corporation Dr. Balsillie became recognized as one of the most able and experienced officers engaged on work among expectant and nursing mothers and children, and she had a high reputation among welfare officers throughout the country. She had been associated with the Etruria Welfare Centre—under the control of the late Mrs. Cecil Wedgwood, and with the Thomas Twyford Welfare Centre in Hanley since their inception. Apart from the reputation she acquired for her professional skill, Dr. Balsillie's pleasing personality earned for her the respect and affection of a wide public. The development of the local maternity and child welfare service owes much to Dr. Balsillie's work. She had also had much to do with the administration of the Midwives Act in the city, and latterly had taken an active part in the work of the Emergency Medical Service.

Dr. EILEEN DILWORTH RYAN died after a short illness at Scotton, Knaresborough, in her forty-third year. She was the daughter of the late T. Dilworth, M.D., of Fermoy, Co. Cork, and wife of Dr. Vincent Ryan, medical superintendent of Scotton Banks Sanatorium. After serving as a V.A.D. in France during the last war she studied medicine at Cork and obstetrics at the Rotunda, Dublin, and graduated M.B., B.Ch. of the National University of Ireland in 1925. For seven years she practised at Dewsbury, where her kindly, cheery, strong personality made her much beloved by patients and friends. At the time of her death Mrs. Ryan was not in practice, but was an active worker for the Harrogate Red Cross Society and the Hospital Linen League as president of the local Catholic Mothers' Union. Much sympathy is felt with her husband and three small sons, now at school in Ireland.

Dr. GORDON CHRISTOPHER POUNDS died at South Elmsall on June 23, aged 59. A native of Blackheath, Kent, son of the late Captain G. C. Pounds of the Merchant Navy, he was educated at Charterhouse and Charing Cross Hospital. After qualifying as M.R.C.S., L.R.C.P. in 1905, he practised at Bexleyheath until 1924, and during the last war was medical officer in charge of an Army camp near Welling. Later he served for two years as ship surgeon, and then set up in practice at South Elmsall, an important mining community in South Yorkshire. He held appointments as medical officer to several collieries and was devoted to the welfare of the miners and their families, by whom he was beloved. In May, 1939, he was appointed a medical examiner for the armed Forces, but ill-health compelled him to relinquish these duties. During his fatal illness of nearly a year he faced much suffering with unflinching courage.

Dr. CLARENCE EDWARD WIGAN, who died recently at Rock, near Wadebridge, at the age of 76, was the youngest surviving son of George Wigan, M.D., of Portishead, Somerset. He studied medicine at Charing Cross Hospital and at Aberdeen, graduating M.B., C.M.Aberd. in 1891. After two years in practice at Clevedon, Somerset, he moved to London and, settling in Chelsea, became honorary physician to St. Luke's House, Notting Hill Gate. Dr. Wigan joined the British Medical Association in 1895 and at one time regularly attended the meetings of the West London Medico-Chirurgical Society.

The following well-known foreign medical men have died: Dr. JOHN LOVETT MORSE, professor of paediatrics from 1915 to 1921, and since 1921 emeritus professor, at Harvard Medical School, Boston, past president of the American Pediatric Society and New England Pediatric Society, founder and past president of the American Academy of Pediatrics, author of several works on children's diseases, aged 74, of coronary thrombosis; Dr. WILLIAM DAVID HAGGARD, ex-president of the American Medical Association and the American College of Surgeons, aged 67; Dr. B. KENYERES, emeritus professor of forensic medicine and founder of the Museum of Comparative Criminology, and Dr. H. HÜLTI, extraordinary professor of surgery, both of Budapest; Professor FRANCISCO LLOBET, who until recently held the chair of clinical urology in Buenos Aires; Dr. WILHELM VON SPEYER, for more than forty years director of the hospital for mental diseases at Berne and professor of psychiatry at Berne University, aged 86; Dr. EDOARDO MARAGLIANO, emeritus professor of internal medicine at Genoa, founder of *Archivio italiano di Clinica Medica* and co-editor of *Tubercolosi* and *Archivio di Biologie*, aged 90; Professor GIUSEPPE SANARELLI, formerly rector of the University of Rome, successively professor of hygiene at Sienna, Montevideo, Bologna, and Rome, author of works on the aetiology of yellow fever, cholera, typhoid, and spirochaetosis, and editor of *Rivista di Malariologia*, aged 74.

Medico-Legal

ADVERTISEMENT BY COMPARISON

Many readers have doubtless noticed the practice followed by certain retailers of drugs of publishing a catalogue divided into parallel columns in which various proprietary drugs made by other firms are mentioned by name and compared with similar preparations made by the advertisers and sold at a lower price. A catalogue of Amblins (Chemists), Ltd., was challenged in the High Court by Bismag, Ltd., at the end of last year. Amblins printed in the left-hand column of their catalogue, "Bisurated Magnesia Tablets. Analysis: Bismuth Carb., Soda Carb., Magnesia Carb., Excipient. Price 1s. 3d. for 50 tablets." The right-hand column, describing the firm's own substitutes, read: "Prescription No. 7. Bismuthated Magnesia Tablets. Analysis: Bismuth Carb., Soda Carb., Magnesia Carb., Excipient. Price: 30 tablets 6d., 75 tablets 1s." Mr. Justice Symonds said that the Trade Marks Act, 1938, did not extend the previous law so as to prevent the use which Amblins made of the trade-mark "bisurated" in relation to Bismag's goods and not their own, and he therefore refused to grant an injunction to prevent that use.[1] The Court of Appeal has now held[2] that he was wrong. Sir Wilfrid Greene, Master of the Rolls, said that the catalogue, and a poster drawing attention to it, stated clearly that, whereas Amblins were prepared to sell the various patent medicines of other firms which they described, they were offering and recommending to the public remedies of precisely the same composition and precisely the same virtues at a lower price. In other words, they were saying that their remedies were exact equivalents of the corresponding patent medicines: that they were not merely substitutes, but were substitutes of the same composition and the same efficacy. They used the word "bisurated" in a trade-mark sense—indicating the origin of the goods—and for the purpose of advertising and describing the virtues of their own goods; and they were thus obtaining for themselves a benefit from the reputation enjoyed by those goods sold under and identified by the trade-mark. The law before 1938 would not have prevented this use, and the right now claimed for the first time under the Act of 1938 was novel. By this Act it is an infringement to use a trade-mark upon other goods, or in physical relation to them, or in an advertising circular, "as importing a reference to some person having the right . . . to use the trade-mark, or to goods with which such a person . . . is connected in the course of the trade." The Master of the Rolls held that Amblins had used the trade-mark "bisurated" "in relation to" the goods of Bismag, and had therefore infringed the exclusive rights of Bismag to use that word. He made clear, however, that he held a very low opinion of the Act; and Lord Justice MacKinnon, dissenting, doubted if the entire Statute Book could be successfully searched for a sentence of 253 words which was of more fuliginous obscurity than the relevant Section 4 (1). The reason for the passing of an Act used in simpler days to be given in the preamble, and he could conceive of a cynical person suggesting as a preamble for the present Act—if Bismag's claim was right—"Whereas the business of the proprietors of quack medicines in fleecing the public has been unduly hampered by the decision in the Yeast-Vite case, and whereas it is in the national interest that this obstacle shall be removed . . ." Bismag failed to satisfy him that "the language of dark and tortuous prolixity" on which they founded their claim created a new right to be broken by what Amblins did. As, however, Lord Justice Clauson agreed with the Master of the Rolls, the appeal of Bismag, Ltd., was allowed. Two judges have therefore pronounced on each side, and perhaps the House of Lords may clear up the question whether this use of a trade-mark is an infringement. It is an expensive way of discovering what the draftsman meant.

[1] *British Medical Journal*, March 2, 1940, p. 372.
[2] 1940 2 All E.R. 608.

DOCTOR CONVICTED OF ABORTION

The conviction of a registered medical practitioner for illegal abortion is very rare. On June 10, before Mr. Justice Atkinson at the Central Criminal Court, Crichton Alison, M.B., Ch.B., was found guilty of conspiring with two other persons to perform illegal operations on three young women. His fellow-prisoners were Kaikahuson Bram Kermani, an Indian medical student, and Delia Walsh, a woman of 22 of no occupation. It was alleged by the prosecution that Alison, under cover of his Harley Street address, carried on a criminal practice through the instrumentality of the two others, who lived in West End Lane, Hampstead; that the three young women consulted him and he sent them to Kermani's address; that he received fees of £50, £50, and £65; and that the police found at Kermani's house three women in bed under treatment. Dr. Alison said to the police and in court that he specialized in anaesthetics and had a panel practice in Lambeth Walk. He was not a gynaecologist. Kermani was introduced to him as a doctor who specialized in women's diseases. The three women concerned in the case were sent by him to Kermani as threatened or inevitable abortion cases which would require steady watching or treatment. He did not treat or examine them himself. His fee for consultation was £3 3s. Kermani usually charged fifty guineas; this fee was paid to Dr. Alison, but he merely deducted three guineas and paid the rest to Kermani. Kermani in evidence said he had never claimed to be a doctor. He declared that Miss Walsh knew nothing of any arrangement he had made with Dr. Alison but simply carried out instructions. He denied that any instrument was used.

Dr. Alison and Kermani each received five years' penal servitude and Walsh was bound over for three years.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The Marmaduke Sheild Scholarship in Human Anatomy, of the annual value of £100, has been awarded to D. A. W. Edwards (Christ's College).

UNIVERSITY OF LONDON

The name of Sir Wilson Jameson, M.D., F.R.C.P., has been submitted to the Ministry of Health as a representative of the University on the Royal Sanitary Institute and Sanitary Inspectors' Examination Joint Board.

Dr. Ivor J. Davies, F.R.C.P., has been appointed representative of the Chancellor on the Court of Governors of University College of South Wales and Monmouthshire.

The degree of Ph.D. in the Faculty of Medicine (non-clinical) has been conferred on Chang Shaw Jang (College of the Pharmaceutical Society) for a thesis entitled "Interaction of Drugs on Adrenergic Transmission," and the degree of D.Sc. on Phyllis A. Clapham (London School of Hygiene and Tropical Medicine) for works on helminthology.

Amendments in Regulations, etc.

In and after the session 1940–1 and until further notice the M.B., B.S. examination will be held in October and April, instead of November and May, beginning on the second Monday in October and the third Monday in April. Entries must be received not later than August 31 and February 25 respectively. The examination will be held under the old regulations as well as the new regulations in October, 1940, and April and October, 1941. Willesden Municipal Hospital has been added to the list of recognized fever hospitals at which the course of fevers may be taken.

Until further order candidates submitting a thesis for the M.D. and M.S. examinations will be permitted to supply two instead of four copies.

The October, 1940, examination for the Diploma in Clinical Pathology has been postponed until January, 1941, and the last date for receiving entries will be December 1, 1940. The examination will begin on the second Monday in January, 1941.

An internal student who has obtained the M.D., M.S., or Ph.D. degree in the Faculty of Medicine may be permitted

to proceed to the D.Sc. degree if, in the opinion of the Senate, the published work he submits falls within the purview of the Faculty of Science.

Scholarships, Studentships, and Prizes to be Awarded in 1940

At the beginning of the war the University decided to discontinue all scholarships, etc. After reconsideration, however, it has been decided to introduce this year a modified scheme. As far as possible the regulations already existing for each particular award will apply, but it will be understood that in some cases modifications will be necessary. Correspondence in regard to scholarships and studentships should be addressed to the Academic Registrar at 42, Gyles Park, Stanmore, Middlesex. The awards to be offered include six university postgraduate studentships of £150 each, tenable for one year, the Paul Philip Reitlinger Prize, the William Julius Mickle Fellowship, the gold medals at the M.D., M.S., and M.B., B.S. examinations, and the Carpenter Medal.

UNIVERSITY OF LEEDS

Mr. A. S. Johnstone, M.B., F.R.C.S.Ed., has been appointed honorary demonstrator in radiological anatomy in the department of anatomy, and Mr. G. B. Royce, M.B., part-time demonstrator in physiology.

UNIVERSITY OF GLASGOW

At a ceremony of graduation on June 28 the following medical degrees were conferred:

M.D.—J. Watson, *T. C. Macdonald (with high commendation), *J. A. Bell, *G. A. Fitzpatrick, *J. B. Fleming, *J. D. Fraser, *A. Leitch.

* In absentia.

The Services

NAVAL AWARDS

The King has appointed Surgeon Commander Douglas Murdo Beaton, R.N. (H.M.S. *Warspite*) to be an additional O.B.E. (Military Division) for skill and devotion to duty in the second Battle of Narvik.

The King has awarded the D.F.C. to Surgeon Lieutenant Robert Andrew Du Val, R.N.V.R. (H.M.S. *Eskimo*), for daring, resource, and devotion to duty in the second Battle of Narvik.

MENTIONS IN DISPATCHES: ROYAL NAVY

Surgeon Lieutenant William Albert Bruce Cooper, R.N.V.R. (H.M.S. *Versatile*), has been mentioned in dispatches for courage and devotion to duty on the Dutch coast.

IMMEDIATE AWARDS, B.E.F.

The following immediate awards have been made by the Commander-in-Chief, British Expeditionary Force:

Military Cross

Lieutenant (Acting Captain) J. Reynolds, R.A.M.C.

Throughout the whole operations Captain Reynolds's example of coolness and self-control under fire was a great asset to his battalion. On the night of June 1-2 the enemy shelled the Mole at Dunkirk, on which were concentrations of British and French troops. Captain Reynolds obtained carrying parties to move the wounded, first to the beach and later to the ambulance. He altogether dealt with some two dozen wounded and accompanied them to the advance dressing station, where he worked all through the day. By his prompt action he saved many lives and showed a complete disregard for his personal safety.

Lieutenant A. V. Stevens, R.A.M.C.

On May 28 Lieutenant Stevens was sent back with a convoy of wounded from Mont des Cats to an advanced dressing station near Poperinghe. On arrival he found it practically destroyed by air bombing. He collected more wounded from the ruins and took his convoy to Dunkirk. After embarking his casualties and attending to further casualties on the beach he returned with more medical supplies to Mont des Cats. On his arrival he found that his Division had retired and the position was being heavily shelled, the woods and buildings being on fire. He found an undamaged vehicle and succeeded in bringing out a number of wounded who had been left in a monastery that had since caught fire. On his way back to Dunkirk he collected into his convoy other ambulances which had lost their way. The convoy was attacked by enemy tanks, and the majority of the ambulances destroyed and the wounded killed. The tanks were in turn surprised and destroyed by our artillery. Lieutenant Stevens thereupon collected what men remained alive into the only remaining ambulance and brought them to Dunkirk. By his persistent courage, endurance, and resource, this officer saved very many lives.

The Territorial Decoration has been conferred upon Major Edwin Gaved Andrew, late R.A.M.C.(T.A.).

The Efficiency Decoration of the Territorial Army has been conferred upon Colonel William Albert Robertson, C.B.E., M.C., Major (acting Lieutenant-Colonel) Joseph Walker Hirst, R.A.M.C.(T.A.), and Major Oliver Francis Waring Robinson, R.A.M.C.(T.A.).

CASUALTIES IN THE MEDICAL SERVICES

ROYAL NAVY

Surgeon Rear-Admiral JOHN REID MUIR, R.N. (ret.), of Paignton has been killed by enemy action at the age of 68, while serving as a lieutenant in the Royal Naval Volunteer Reserve. He was educated at the University of Edinburgh, where he graduated M.B., C.M. in 1894. He was elected F.R.C.S.Ed. in 1924. After qualifying he acted as house-surgeon at the Royal Infirmary, Edinburgh, and later was a ship surgeon with the Pacific and Oriental Steam Navigation Company. In 1900 he joined the Royal Navy as a surgeon, and was in the battle cruiser *Tiger* at the battles of Dogger Bank and Jutland. He retired in 1928, but, despite his age, volunteered for service at the outbreak of the present war; on September 18, 1939, he was granted a commission as sublieutenant in the R.N.V.R., and was promoted lieutenant on December 18. He was the author of "Hints for the Use of Medical Officers in Action" (*Naval Medical Journal*, 1916), of *Years of Endurance* (1936), and of *The Life and Achievements of Captain James Cook* (1939). Surgeon Captain A. W. B. Livesay, R.N. (ret.), writes: As a brother officer in the Naval Medical Service I should like to pay a slight tribute to my old friend John R. Muir, Surgeon Rear-Admiral retired. After a lifetime devoted to the Service and his country he died gloriously. John Muir, under a most friendly and unassuming manner, was possessed of qualities far above the average. His career as a naval doctor was one of unbroken success. He was a many-sided man. Added to his professional ability he was a first-rate seaman. He held a Master's certificate and was navigating officer of the large yacht requisitioned by the Admiralty, in which after ten months' strenuous work on the bridge, and in constant peril of his life, he eventually met his fate. After retiring from the Navy he blossomed out as a most successful author. In his lighter books his pictures of ward-room life, full of humour and free from exaggeration, have never been excelled. Just before the war he published a life of Captain Cook. It is delightful reading, giving evidence of months of patient research, and was uniformly praised by the reviewers. Mr. Geoffrey Shakespeare, then Secretary to the Admiralty, in a speech last March told us that there was an Admiralty patrol vessel with four commissioned officers whose united ages came to over 280. John Muir, navigating officer, was the youngest of these, aged 68. We have lost in him a charming personality and a most gifted and gallant man.

Surgeon Commander CHARLES HAMILTON EGAN, R.N., is reported missing, presumed killed in action in H.M.S. *Glorious*. He was 35 years of age, and received his medical education at Guy's Hospital, qualifying M.R.C.S., L.R.C.P. in 1927. He joined the British Medical Association in 1928. He was the only son of Mrs. Egan of Port Elizabeth, South Africa.

ROYAL ARMY MEDICAL CORPS

Major JOHN NOEL CONCANNON, R.A.M.C., has been killed in action. He was born in 1906, was educated at the University of Dublin, and qualified L.Med., L.Ch. in 1932. In the following year he was gazetted lieutenant in the Royal Army Medical Corps, was promoted to captain in 1934, and appointed adjutant, Territorial Army, in 1939. He leaves a widow.

The name of Lieutenant AUGUSTUS WILLIAM CARBONI, R.A.M.C., is included in an Army Council list of officers killed published on June 28. Dr. Carboni graduated M.B., B.Ch., B.A.O. of the National University of Ireland in 1939. His home was in Gibraltar.

Wounded

Acting Major OSWALD CHRISTOPHER DOBSON, R.A.M.C.
Captain Hugh Mannington, R.A.M.C.

DEATHS IN THE SERVICES

Lieutenant-Colonel PERCY JOHN PROBYN, D.S.O., R.A.M.C. (ret.), died at Hampstead on June 27, aged 72. He was born at Pontypool, the son of Frederick Probyn, J.P., of Trevethin, Monmouthshire, and received his medical education at Charing Cross Hospital, where he won an entrance scholarship and the Pereira prize. He served as demonstrator of

anatomy at the hospital and as prosector at the Royal College of Surgeons of England. In 1893 he took the M.R.C.S., L.R.C.P., in 1906 the M.B., B.S.Lond., and in 1907 the D.P.H.; he was also called to the Bar, from Lincoln's Inn, entered the Army as surgeon lieutenant in 1895, became lieutenant-colonel on March 1, 1915, and retired on December 4, 1920. He served in West Africa in 1897–8 (medal with clasp); in Sierra Leone in 1898–9 (clasp); throughout the South African War, 1899–1902, taking part in the action of Magersfontein, the relief of Kimberley, the actions of Paardeberg, Poplar Grove, Dreifontein, Vet River, and Zand River, in operations in the Orange Free State and Transvaal, including actions at Johannesburg, Pretoria, and Diamond Hill, was mentioned in dispatches (Queen's medal with five clasps, King's medal with two clasps, and the D.S.O.). He also served in France and Flanders during the war of 1914–18.

Lieutenant-Colonel DONALD GORDON CARMICHAEL, R.A.M.C. (ret.), died suddenly at Putney on June 19, aged 63. He was born on October 28, 1876, the son of the late Colonel J. C. G. Carmichael, I.M.S., and was educated at the University of Edinburgh, where he graduated M.B., Ch.B. in 1902, and at St. George's Hospital. He entered the Royal Army Medical Corps as lieutenant on January 31, 1903, became major on October 31, 1914, and retired on December 29, 1923, on receiving his step in rank to lieutenant-colonel. While in the Army he was a specialist in the diseases of women and children, serving as such in the 9th Lahore Division, and was later in charge of the Hospital for Women and Children at Rangoon. After retirement he was in practice at Putney. He had been a member of the British Medical Association since 1906.

Medical Notes in Parliament

The text of the Purchase Tax Bill was issued on July 2. The tax will not apply to food or drink, to light or water, or to rent. The purchase of children's clothing and boots and shoes will be free of tax. Medical and surgical appliances and essential drugs which are specially expensive will also be exempt.

Medical Services of Ministry of Pensions

When the House of Commons discussed the Vote for the Ministry of Pensions Sir WALTER WOMERSLEY said that the expenditure on medical services showed an increase. Structural alterations to existing Ministry of Pensions hospitals and the establishment of three new hospitals would bring the total bed strength up to 5,517. In addition certain new hospitals now being erected by the Ministry of Health would be administered by his own Department in conjunction with the Ministry of Health as part of the Emergency Hospital Scheme. The appeal for medical men to go into this service had met with a very good response, and he was satisfied that there were now enough medical men to cope effectively with the large amount of work that was anticipated. In the new Royal Warrant provision would be made for pensions to parents who could prove that they had been dependent for a reasonable period before the war on the earnings of their sons killed in the war. In the former Warrant pensions to disabled men were limited to allowances in respect of only three children in one family, but in future there would be no limit to the number of children for whom allowances would be paid. To leave the rates of pensions as they were in the Royal Warrant of September would be indefensible in view of the increased cost of living, and there would be new rates of pensions and other concessions. The right of appeal to an independent body was an essential part of the system if it were practicable at a given time. At present it was not possible to constitute tribunals all over the country, but cases in which the medical evidence furnished by a claimant conflicted with that of the Ministry's own medical staff would be submitted to independent specialists nominated either by the Royal College of Physicians or the Royal College of Surgeons.

Sir FRANCIS FREMANTLE paid a tribute to the very great debt owed to the medical staff of the Ministry of Pensions. The medical men in the Ministry might make mistakes, he said, but they made very few. When he had looked into the details of these cases he had nearly always been convinced that the Ministry had been right when its opinion differed from that of the private doctor. He was glad that the Minister of Pensions recognized the necessity for further confirmation, although it might be only in 1 per cent. of the cases that the opinion of these medical officers had been wrong. It was a splendid arrangement to have an appeal tribunal, which had the advantage of being the best kind of committee—namely, a committee of one, a man nominated by the President of the Royal College of Physicians or Royal College of Surgeons. Could the Minister give any idea of the number of appeals that had been heard in this way, and the result?

Sir Francis asked what liaison had been established between the Ministry of Pensions and the Ministries for which that Department had to provide the pensions—the three fighting Services and the civil medical services of the Ministry of Health, on the last of which the greater burden of casualties might be laid if there were a number of severe air raids on this country. The Ministry of Health, in its Emergency Medical Service Hospitals, would treat these cases, which would eventually come to the Ministry of Pensions for payment. One of the specialist services which they wanted to see properly used was physiotherapy. Such methods of treatment were being used by the Ministry of Pensions in its own hospitals, but the right thing to do was so to treat the cases from the beginning.

Doctors' Duties in Air Raids

Mr. MACDONALD told Mr. Groves, on July 2, that he did not think it practicable to lay down definite rules about what all doctors should do in case of air raids. Those who were not designated for immediate duty at first-aid posts or hospitals might be called on later to reinforce those services if they were available. If, in the meantime, they received calls from private individuals they could be relied on to use their judgment, as they were accustomed to do, in deciding whether the patient's condition required an immediate visit. Where the individual was injured as the result of the air raid the necessary medical attention would normally be given through the casualty services, and the need for a special summons to a doctor should not arise.

Replying also to Mr. Critchley, Mr. MacDonald said that medical officers of health in charge of casualty services had been authorized, if the need arose, to call on any available doctors not already attached to those services, and it was for them to make their plans accordingly, in co-operation with the profession locally.

Medical Care of Refugees

Mr. MACDONALD, on July 2, stated that local authorities had been asked to make available to war refugees the health services available to the normal population of their areas. Domiciliary treatment, if required by a refugee unable to pay for it, might be obtained from the district medical officer by the usual procedure. Any additional approved expenditure incurred by a local authority in the provision of medical attention or of public health services to refugees maintained by a local authority might be included in the local authority's claim for reimbursement by the Exchequer of the additional cost to the authority of receiving or maintaining refugees. The Ministry of Health had not found it necessary to make any special arrangements with general practitioners for the provision of domiciliary treatment for refugees.

Domiciliary Treatment of Air Raid Casualties

On July 2 Mr. GROVES asked the Minister of Health whether persons living a considerable distance from any hospital, and injured in an air raid, but not so seriously injured as to need attention at a hospital, would be obliged to visit a hospital to secure a certificate entitling them to free treatment. Mr. MACDONALD said that the persons described would normally

receive attention in the first instance at a first-aid post or from a mobile unit, and any necessary subsequent treatment through an out-patient department, where a certificate for free domiciliary treatment would be given if the circumstances so required. Any exceptional case where it was not practicable to make use of these arrangements would be considered on its merits.

Woman Medical Officer for Eastern Command.—Mr. EDEN on July 2 told Miss Ward, who asked if the appointment of a woman doctor of senior rank had yet been made to each Command, that an appointment was about to be made in the Eastern Command. Similar appointments in other Commands were not considered to be necessary at present.

Physical Fitness for R.A.M.C.—On June 25 Mr. EDEN, replying to Mr. Groves, said that the standard physical qualification for a commission in the R.A.M.C. was that the candidate should be fit for general service and under 55. Candidates of lower physical fitness had been accepted to meet particular requirements.

Advisory Council for Oversea Reception of Children.—Mr. SHAKESPEARE announced on June 26 that the Advisory Council of the Children's Oversea Reception Scheme had been appointed, with Lord Snell as chairman. It included Dr. Donald Paterson, Hospital for Sick Children, Great Ormond Street. A Scottish Advisory Committee had been appointed with Mr. T. J. Dollan as chairman.

Massage by the Blind.—On June 27 Sir IAN FRASER asked if the Emergency Medical Service was prepared to approve the employment of blind persons qualified in massage and/or medical electricity under the same conditions as sighted members of this profession. Miss HORSBRUGH replied in the affirmative, and hoped that many blind persons who were qualified and suitable for this work would be found employment in the hospitals.

Communal Feeding for Industrial Workers.—Mr. ERNEST BEVIN said on June 26 that he was urgently considering with the other Ministries concerned the provision, as necessary, of facilities for communal feeding for workers in industry, particularly in those areas where large numbers of women were employed in war production. In the same areas he was arranging with the Minister of Health, through the maternity and child welfare authorities, for the provision of day nurseries.

Assistant Hospital Officers.—The Minister of Health states that additional medical officers, known as assistant hospital officers, have been appointed, with the inspection of first-aid post arrangements as one of their most important duties. These officers are acquainted with the medical and surgical requirements arising from modern aerial warfare.

Hospitals in Coastal Areas.—Mr. GROVES asked on June 20 whether Emergency Medical Service hospitals in country areas, and especially those on the east and south-east coasts, had been advised to arrange for alternative accommodation in case they should be put out of action or should be faced with excessive numbers of cases which could not easily be transferred to other hospitals. Mr. MACDONALD replied that arrangements were made by his regional officers to meet the contingencies described.

Physiotherapy in Ministry of Pensions Hospitals.—Sir WALTER WOMERSLEY stated on June 20 that a physiotherapy department working on modern lines with up-to-date equipment was part of every Ministry of Pensions hospital with one exception, where such treatment was not regarded as necessary. His medical officers were in close touch with the consultant adviser in physical medicine to the Ministry of Health and with other consulting experts in physiotherapy.

Notes in Brief

On June 11 Mr. MacDonald informed Mr. David Adams that he was discussing with the Minister of Labour whether steps should be taken to provide physiotherapy to workers engaged on wartime industrial work.

Lord Lloyd is unable to say how soon circumstances will permit of the Colonial Research Advisory Committee being set up. Lord Hailey has consented to serve as chairman of the committee, but no other appointments to it have yet been made.

In pursuance of their duty to provide mortuary accommodation for war emergencies, local sanitary authorities have, where necessary, made emergency provision by adapting and equipping existing buildings for use as mortuaries and, in a few areas, by constructing new temporary accommodation.

Medical News

At the annual general meeting of the British Social Hygiene Council, to be held on Monday next, July 8, at 4.30 p.m., at B.M.A. House, Tavistock Square, W.C., the president, Sir Walter Langdon-Brown, will give an address on "Our Work in Wartime."

The spring programme of the twenty-eighth annual series of Chadwick Public Lectures was brought to a close by a lecture, at the Chelsea Physic Garden, by Professor William Brown, F.R.S., on "Plant Disease in Relation to the Public." Immediately before the lecture the chairman of the Chadwick Trustees, Sir William Collins, presented the Chadwick Prize of £100 and a gold medal to Group-Captain Philip Clermont Livingston, F.R.C.S.Ed., who was nominated by the Director-General of Medical Services, Royal Air Force.

Dr. Reginald Hall has been appointed visiting medical officer to the Belfast City Fever Hospital in succession to the late Dr. A. Gardner Robb.

Dr. Peter Henderson, M.O.H. for the Borough of Todmorden, has been appointed a medical officer to work at the Board of Education.

The following medical promotions in and appointments to the Order of the Hospital of St. John of Jerusalem were announced in the *London Gazette* of June 23. As Knights: Major-General E. W. C. Bradfield, I.M.S., Sir Percival H.-S. Hartley, Lieutenant-Colonel G. E. Peacock. As Commanders: B. G. S. Belas, Colonel A. J. van der Spuy, Captain S. B. Turner, Lieutenant-Colonel W. Vickers. As Officers: A. P. Gibbons, E. J. H. Budge, W. A. Daley, Captain R. V. Steele, late R.A.M.C., Colonel T. C. Boyd, I.M.S., A. R. S. Vickers, R. J. Coto, E. C. Bradford, J. E. Brereton, G. P. Huws, T. Williams, A. J. King. As Associate Officer: Major S. K. Engineer. As Serving Brothers: C. S. Gideon, N. S. B. Vinter, G. Muir, C. G. Booker, Lieutenant-Colonel R. F. D. MacGregor, I.M.S., J. Kerr, F. T. Grey, W. Marshall, H. C. Rollin, T. W. David, G. R. Jones, R. Nelson, G. P. Williams, F. Carroll, D. D. McCowan.

The General Medical Council has caused to be altered and amended the *British Pharmacopoeia,* 1932, by modifying the list of medicines and compounds and the directions for preparing some of them. The changes, which become official on July 5, are set out in a schedule published in the London, Edinburgh, Belfast, and Dublin *Gazettes.* The standard for alkaloidal content of *ipecacuanha* (ipecacuanhae radix; ipecacuanha root) is amended to read: "Not less than 2 % of the total alkaloids of ipecacuanha, calculated as emetine, of which not less than three-fifths consists of non-phenolic alkaloids, calculated as emetine" (formerly two-thirds). Arachis oil may be used in place of olive oil in making the following substances: (1) *Emplastrum Plumbi,* Plaster of Lead. Synonyms: lead plaster; diachylon plaster; diachylon. (2) *Injectio Hydrargyri,* Injection of Mercury. Synonym: Mercurial cream. (3) *Injectio Hydrargyri Subchloridi,* Injection of Mercurous Chloride. Synonym: calomel injection. (4) *Unguentum Hydrargyri Nitratis Forte,* Strong Ointment of Mercuric Nitrate. Synonyms: unguentum hydrargyri nitratis; mercuric nitrate ointment.

It is reported that owing to the vast accumulation of wounded the authorities in Vienna, despite the ban on Jewish doctors, have been obliged to ask for the services of a number of them.

Typhoid fever is still raging in Warsaw, where there are from 200 to 300 cases every day. Fully 90 per cent. of the victims are Jews. The German authorities have increased the number of disinfecting stations from 212 to 400, but have made no attempt to eradicate the source of the disease by clearing out the worst part of the ghetto, where tens of thousands of Jews are confined under pestilential conditions.

The Society of Surgery of Buenos Aires has recently been transformed into the Argentine Academy of Surgery.

Professor H. Vincent, former inspector-general of the Health Service of the French Army, professor at the Collège de France, has been elected vice-president of the Académie des Sciences.

The first report on the working of the Chronic Rheumatism Clinic of the West London Hospital was presented to the Hammersmith Borough Council by Dr. Hugh Burt, chief assistant of the department, who has been in temporary charge since Dr. W. S. C. Copeman left for France for service with the R.A.M.C. The boroughs of Hammersmith, Kensington, and Fulham agreed to give financial assistance to the clinic, the greater proportion of the patients coming from those districts. On the outbreak of war it was closed for a period, but reopened in April of this year. The report states that "the results obtained at the West London Hospital suggest that in a number of cases of arthritis treatment as an out-patient is more beneficial than as an in-patient." The latter "makes some patients too reliant on bed and therefore has a weakening effect."

The New York office of the United States Public Health Services is sponsoring the formation of a Society for the Study of Syphilis for all physicians in the city who are interested in the diagnosis and treatment of the disease.

Six hundred cases of undulant fever were notified in the German Reich in 1938; 458 were in males, 140 in females, and in 2 the sex was not stated. *Brucella abortus* was found in 43 cases.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

Of the principal notifiable diseases only two—measles and enteric—have increased to any degree during the week in England and Wales. Only two administrative areas—Suffolk, West, and Montgomery—are now free from measles, and in many counties notable increases have been recorded, but apart from Lancaster and the West Riding of Yorks the total increase has been due to a general spread in all districts, both urban and rural, rather than to a high concentration in industrial or densely populated areas. For this change in the distribution of measles evacuation is probably chiefly responsible, while the relative mildness of the disease is attributable mainly to the late onset in particularly congenial weather conditions, but the dispersal of susceptibles and avoidance of overcrowding have doubtless played a part.

Administrative areas with a high incidence of measles are: Lancaster 2,038. (Liverpool 122, Manchester 344, St. Helens 73, Burnley 85, Preston 82.) Yorkshire, West Riding, 1,300. (Bradford 115, Wakefield 114, Huddersfield 80, Barnsley 73, Brighouse M.B. 75, Spenborough U.D. 76.) Leicester 741. (Leicester City 578.) Durham 561. (Darlington 40, Chester-le-Street R.D. 84.) Notts 393. (Nottingham 191.) Bucks 307. (Slough M.B. 84, Wycombe R.D. 61, Chepping Wycombe M.B. 58.) Surrey 306. (Surbiton M.B. 100, Croydon 4.) Glamorgan 256. (Swansea 20, Port Talbot M.B. 98, Pontypridd U.D. 36, Rhondda U.D. 34.) Chester 261. (Widely distributed in urban and rural areas.) Northumberland 230. (Newcastle-upon-Tyne 72.)

In London and Birmingham the figures for measles were 23 and 16 respectively. In Scotland only 13 of the 55 administrative areas were involved, and Glasgow contributed over two-thirds of the total. With the exception of the county of Lanark the disease has been almost entirely confined so far to the large towns: Glasgow 1,265, Greenock 182, Edinburgh 148, Dunfermline 52, Kirkcaldy 42, Paisley 29, Ayr B. 22, Port Glasgow 20, Rutherglen 13. In the counties of Lanark and Orkney there were 88 and 12 respectively.

There has been a notable increase in the incidence of enteric fever involving twenty-two administrative areas, but only in nine were there more than 2 cases—namely, Gloucester 13 (Bristol 12, Thornbury R.D. 1); Northumberland 12 (Newcastle-upon-Tyne 1, Ashington U.D. 1, Newbiggin-by-Sea U.D. 9, Morpeth R.D. 1); Northampton 9 (Northampton 1, Kettering M.B. 6, Rushden U.D. 1, Wellingborough U.D. 1); Lancaster 5 (Burnley 1, Manchester 1, Preston 1, Ince-in-Makerfield U.D. 2); London 4 (1 each in Greenwich, Lambeth, Lewisham, and Wandsworth); Denbighshire 4 (Ruthin M.B. 3, Aled R.D. 1); Durham 3 (Gateshead 1, Whickham U.D. 2); Sussex, E. 3 (Brighton 2, Portslade-by-Sea U.D. 1); Yorks, West Riding, 3 (1 each in Bradford, Sheffield, and Pudsey M.B.).

No. 24

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended June 15, 1940.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (*a*) England and Wales (London included). (*b*) London (administrative county). (*c*) Scotland. (*d*) Eire. (*e*) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable o no return available.

Disease	1940 (a)	1940 (b)	1940 (c)	1940 (d)	1940 (e)	1939 (Corresponding Week) (a)	1939 (Corresponding Week) (b)	1939 (Corresponding Week) (c)	1939 (Corresponding Week) (d)	1939 (Corresponding Week) (e)
Cerebrospinal fever	232	11	62	1	7	21	1	7	1	—
Deaths		2	5				—	—		
Diphtheria	698	40	206	35	32	755	70	182	44	9
Deaths	12	—	9	1	2	17	2	—	2	—
Dysentery	24	1	31	—	—	21	4	28	2	—
Deaths			—	—	—			1	—	—
Encephalitis lethargica, acute	—	—	—		—	4	2	1		—
Deaths		—	2				1	—		
Enteric (typhoid and paratyphoid) fever	77	4	6	6	1	21	4	5	12	2
Deaths	1	—	—	—	—	1	—	—	—	—
Erysipelas		18	29	1	1		39	53	5	2
Deaths		1	—				2	1		
Infective enteritis or diarrhoea under 2 years										
Deaths	43	7	11	7	8	30	9	10	4	4
Measles*	9,210	23	1,877		61		34	135		3
Deaths	6	—	4	3	2	2	—	—	1	—
Ophthalmia neonatorum	90	11	32		—	95	7	37		2
Deaths										
Pneumonia, influenzal†	551	20	2	4	8	635	55	3	—	17
Deaths (from influenza)	11	2	1	—	—	14	1	3	—	1
Pneumonia, primary			179	6				157	17	
Deaths‡		20		11	12		5		7	5
Polio-encephalitis, acute	1	—				1	—			
Deaths		—					—			
Poliomyelitis, acute	11	—	1		1	15	4	1		—
Deaths		—	—				—	—		
Puerperal fever	3	3	10	1	—	2	2	10	—	—
Deaths		—					1§			
Puerperal pyrexia	161	12	13		—	183	14	27		1
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	888	28	105	37	57	1,549	161	240	60	79
Deaths	—	—	—	1	—	—	—	—	—	—
Small-pox	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—		—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough*	744	7	74		18		324	180		18
Deaths	3	—	1	—	—	14	3	4	3	1
Deaths (0-1 year)	281	27	61	28	26	264	37	60	20	25
Infant mortality rate (per 1,000 live births)						41	33			
Deaths (excluding still-births)	4,333	706	605	170	153	3,939	661	551	178	137
Annual death rate (per 1,000 persons living)			12.2	11.3	13.4	9.7	8.5	11.2	12.0	12.0
Live births	6,149	915	909	365	260	6,754	1,082	956	439	252
Annual rate per 1,000 persons living			18.4	24.4	22.8	16.6	13.9	19.4	29.5	22.1
Stillbirths	229	42	31			218	26	37		
Rate per 1,000 total births (including stillborn)			33			32	23	37		

* Made notifiable generally on November 1, 1939.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

‡ Since January 1, 1940, figures for London (b) have been for deaths from all forms of pneumonia; the corresponding figures for 1939 relate to deaths from lobar pneumonia only.

§ Death from puerperal sepsis.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Shaky Hand

"INQUIRER" writes: I would be grateful for any suggestion as to prognosis and treatment of the above-mentioned condition. It occurs in two members of a family—young adult females otherwise strong and healthy and not particularly of nervous disposition. It is only evidenced in fine work of the fingers, such as threading a needle, particularly if hurried and in presence of an onlooker.

Ophthalmic Lithotrite for Non-magnetic Foreign Bodies

JOHN WEISS AND SON, Ltd. (287, Oxford Street, W.1), write: With reference to Wing Commander J. Myles Bickerton's letter (June 29, p. 1076) we have in stock a foreign-body lithotrite according to his description. It was last published in our catalogue dated 1916, but previous editions prove that it dates back at least as far as 1863.

LETTERS, NOTES, ETC.

A Case of Quintuple Pregnancy

Dr. F. NORMAN GREEN writes from the C.M.S. Maseno Hospital, Kisumu, Kenya: The following case of quintuple pregnancy is worth recording. On April 14, 1940, a Wanga (North Kavirondo) woman, aged about 28, was admitted to this hospital during her fourth confinement. The first two pregnancies were normal, but the third produced twins, one foetus being born alive and the other stillborn, both males. In her fourth pregnancy she said she had missed nine periods, but the five foetuses were obviously premature of about six and a half to seven months. The pregnancy was a quintovular one, there being five separate placentae and five amniotic sacs. The first foetus was born in the woman's village near Butere, and the remaining four after admission to this hospital. Particulars of the five foetuses are as follows:

No.	Born at	Sex	Weight	Vitality	Remarks
1	2 a.m.	F.	2¾ lb. (?)	Lived 1 hour	
2	10.30 a.m.	M.	2 lb.	Stillborn	
3	10.40 a.m.	F.	2 lb.	Stillborn	Slightly macerated
4	10.50 a.m.	M.	1¾ lb.	Lived 40 mins.	
5	10.55 a.m.	M.	1¼ lb.	" "	Born in a caul

After an uneventful recovery the woman was discharged from hospital on April 25.

Books on First Aid

Now that air raids on this country are becoming a familiar feature of everyday life there is a quickened interest in anything relating to first aid, both among medical men and the lay public. There are a large number of pamphlets, booklets, and books on the subject of varying merit and reproducing illustrations that have a strong family resemblance. Among these the British Red Cross Society has recently issued a second edition of its *First Aid* (edited by St. J. D. Buxton, F.R.C.S., Oxford University Press, 2s. 6d.). It is a notebook with diagrams for use during attendance at Red Cross courses. There are good line drawings of the familiar methods of bandaging and splinting the broken limb and methods of dealing with haemorrhage. We note with interest that the illustrations of Schäfer's method of artificial respiration depict the operator astride the patient, as recommended in a recent article in the *Journal* on this subject by Mr. R. T. Payne. *Air-Raid First Aid*, by Colonel R. J. Blackham (John Bale, Sons and Staples, Ltd., price 6d.), starts off with two illustrations of an incendiary bomb, proceeds to a description of war gases, and then follows the familiar lines of first-aid instruction. The small print is not easy to read, and perhaps it would have been better to have said less in larger type. We also note this instruction in Schäfer's method of artificial respiration: "Kneel astride facing the patient's head." *First Aid Competitions*, by Captain A. C. White Knox (Dale, Reynolds and Co. Ltd., 1s. post free), has been compiled with the object of trying to standardize the work of the three units in first-aid competitions—that of the secretary, the judge, and the competitor. Competitions in first aid were apparently introduced in 1897. *Practice in First Aid and Nursing*, arranged by Major S. T. Beggs, medical officer of health for Middleton (price 1s., The Times Printing Service, Blackburn), is another attempt to help the competitor and learner by the method of question and answer. Here again the position of the operator in trying Schäfer's method of artificial respiration is given as "astride of the patient's body." Lastly, *First Aid for First Aiders*, by Herry-Perry and David York (Hutchinson and Co., Ltd., 3s. 6d.), is an attempt by verse and humorous illustration to introduce a little light relief into a subject that, however important, is apt to be a little dull. Here is an example:

> "The man who takes Corrosive Sublimate
> Is simply asking to become the 'late.'
> A prompt emetic after white of egg
> May sometimes help to pull the sexton's leg."

Fever during Sulphonamide Therapy

Dr. C. E. R. NORMAN (Golden Rock, India) writes: Dr. W. Lees Templeton (April 13, p. 636) believes that this may be due to toxic action. I agree with him. I have seen at least half a dozen cases of fever during the treatment of gonorrhoea by sulphonamide and M & B 693. The fever occurred about the fifth to sixth day and stopped with the discontinuance of the drug.

Herbal Folk-lore Remedies

We have had several inquiries about the use of herbal remedies as substitutes for the usual pharmacopoeial drugs. This subject received much attention in Germany during the past few years because the Nazi Government regarded the modern science of therapeutics as being very largely a Jewish production, and therefore set about promoting a reversion to the old German medicinal folk-lore. Those who desire information on this subject can find it in the large textbook by Dr. Gerhard Madaus entitled *Lehrbuch der Biologische Heilmittel*, which was reviewed in the *British Medical Journal* of May 28, 1938 (p. 1159). Dr. Madaus attributes numerous medicinal virtues to practically every plant that grows in Germany, and mentions hundreds of traditional remedies for every disease.

Baby Week, 1940

The twenty-fourth National Baby Week began on Monday, July 1, under the auspices of the National Baby Welfare Council, 29, Gordon Square, W.C.1. The first National Baby Week was held during the last war, and an outcome of that propaganda was the passing of the Maternity and Child Welfare Act in 1938. Now in 1940 we are in the midst of another war—more terrible than the last—and we must ensure that in the stress and strain of the present calamity the welfare of the future generation is not overlooked. Children are facing risks, dangers, and many changes—changes of home, changes of custom—and their well-being is a national responsibility.

Eligibility

A medical man in Cardiff sends us an extract from the advertising pages of the *South Wales Echo and Express* containing the following announcement: "Doctor, Young, experienced, illegible, Requires Employment (now or book)." Our correspondent adds that local pharmacists must be very apprehensive at this "essential" qualification.